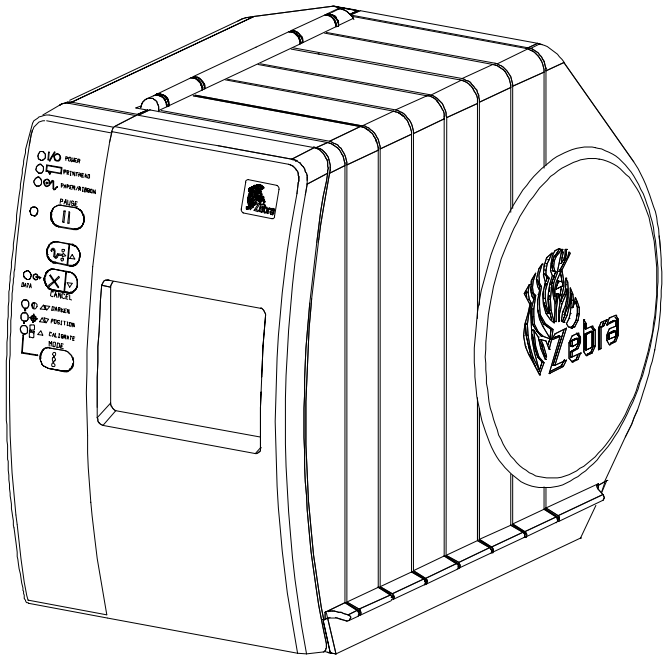
Stripe®

User's Guide

For Models S-300 and S-500



Zebra Technologies Corporation
333 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3109

Phone Number: (847) 634-6700
Telefax Number: (847) 913-8766

Zebra Technologies Europe Limited
Zebra House, The Valley Centre
Gordon Road, High Wycombe
Buckinghamshire HP13 6EQ England

Phone Number: +44 (0) 1494 472872
Telefax Number: +44 (0) 1494 450103

Customer order # 44870L

Manufacturer part # 44870LB Rev. 2

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Note: This equipment has been tested and found to comply with the limits for a Class A digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Table of Contents

1 Getting Started

Congratulations! You have just purchased a high-quality thermal demand printer manufactured by the industry leader in quality, service, and value—Zebra Technologies Corporation. For over 25 years, Zebra has provided customers with the highest caliber of products and support.

This manual provides all of the information you will need to operate your printer on a daily basis. To create label formats, refer to the ZPL II Programming Guide (part # 46469L—if you did not order one with your printer, it is available free by sending in the postcard at the front of this manual).

There is also a two-volume maintenance manual for this printer. **Volume 1: General Maintenance** (part # 44868L) contains the information you may need in order to maintain your printer, and **Volume 2: Circuit Descriptions and Electrical Schematics** (part # 44869L) contains information necessary for repairing the circuit boards at the component level. You may order both volumes by specifying part # 44452L.

Unpacking

Save the carton and all packing materials in case shipping is ever required.

Inspect the printer for possible damage incurred during shipment.

- Check all exterior surfaces for damage.
- Raise the Media Access Door and inspect the Media Compartment for damage to components.

Reporting Damage

If you discover shipping damage upon inspection:

- Immediately notify the shipping company of the damage.
- Retain all packaging material for shipping company inspection.
- File a damage report with the shipping company and notify your local distributor and Zebra Technologies Corporation of the damage.

Zebra Technologies Corporation is not responsible for any damage incurred during shipment of the equipment and will not repair this damage under warranty. Immediate notification of damage to the shipping company or its insuring agency will generally result in ensuring any damage claim validity and ultimate monetary compensation.

Storage and Reshipping

If you are not placing the Zebra Stripe Printer into operation immediately, repackage it using the original packing materials. The Zebra Stripe Printer may be stored under the following conditions.

- Temperature: -40° to 140° F (-20 to 60° C)
- Relative humidity: 5% to 85% non-condensing

To ship the Zebra Stripe Printer, carefully pack it in a suitable container to avoid damage during transit. Whenever possible, use the original container from the factory. A shipping container can be purchased from Zebra Technologies Corporation, if the original one is lost or destroyed.

If you use a different container, package the printer carefully to avoid damage.

> **CAUTION:** When packaging the printer in a rigid container, use shock mounts or shock-absorbing packing material. A rigid container will allow shock on the outside to be transmitted undamped to the printer which may cause damage. **Also, before packing, remove all ribbon and media from the supply and take-up spindles to prevent damage to the printer.**

Site Requirements

> **CAUTION:** To insure that the printer has proper ventilation and cooling, do not place any padding or cushioning material under the unit, because this restricts air flow.

The Zebra Stripe Printer may be installed on any solid, level surface of sufficient size and strength to accommodate the physical dimensions and weight of the unit. The area enclosure in which the printer will operate must meet the environmental conditions specified. Electrical power must be available and in close proximity to the printer.

Since the Zebra Stripe Printer was designed and is fabricated as an industrial-type unit, it will function satisfactorily in areas such as warehouses, factory floors, and office environments that conform to specified environmental and electrical conditions.

Printer Power Up

> **WARNING!!** Check the AC voltage requirements for the printer before connecting it to a source of electrical power.

Follow the instructions in this section to connect this printer to a source of electrical power and a data communication cable.

Voltage Selection

The Stripe is available from the factory preset for either 100-120 VAC electrical power or 220-240 VAC electrical power. **Refer to the product label on the back of the printer and make sure that the unit is properly configured for your power requirements.**

AC Power Cable

The AC Power Cable has a three-prong female connector on one end. See Figure 2. This connector must be plugged into the mating connector on the left side of the printer. See Figure 1.

The electrical connection at the other end of the AC Power Cable will be one of the following:

- US Standard 110 VAC three-prong plug
- Great Britain Standard 220 VAC three-prong plug
- European Standard 220 VAC three-prong plug

WARNING!! For personnel and equipment safety, always use a three-prong plug with an earth ground connection.

Insure that the AC Power ON/OFF Switch is in the OFF (0) position before connecting the AC Power Cable to a nearby electrical outlet.

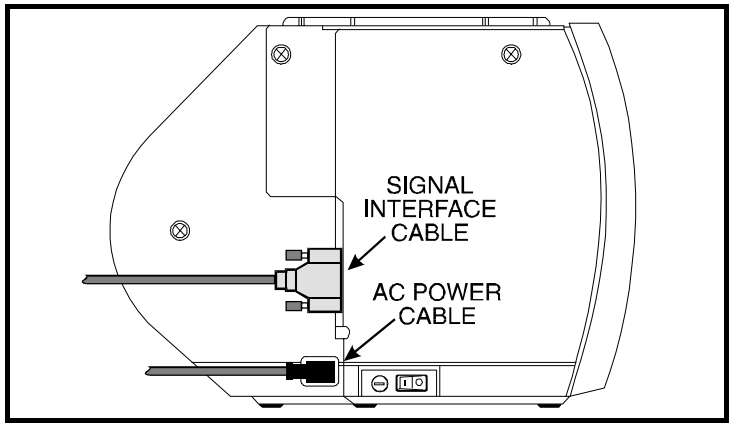

Figure 1 Cable Connections

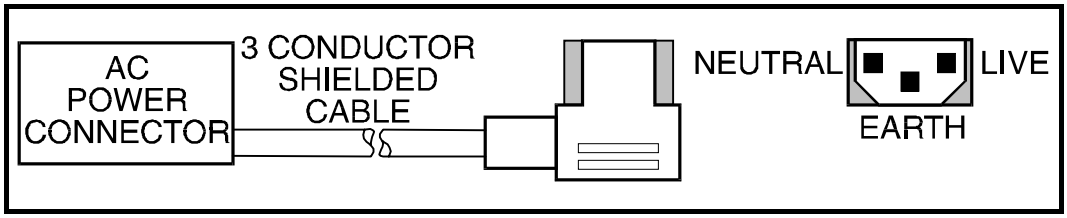

Figure 2 AC Power Cable

Communications

The Stripe comes with either an Electronics Industries Association (EIA) RS-232 serial data interface or a factory-installed parallel interface. In both cases, you must supply the required interface cable for your application. See the Appendix for specific cable requirements.

CAUTION: Zebra printers comply with FCC "Rules and Regulations", Part 15, Subpart J, for Class A Equipment, using fully shielded six-foot data cables. Use of longer cables or unshielded cables may increase radiated emissions above the Class A limits.

Cutter Module Interface (For Stripes with the Factory-Installed Cutter Option)

The Cutter Module connects to the printer via a standard 8-pin connector.

The cable on the front of the printer plugs into the connector on the bottom of the Cutter Module once the Cutter Module has been installed.

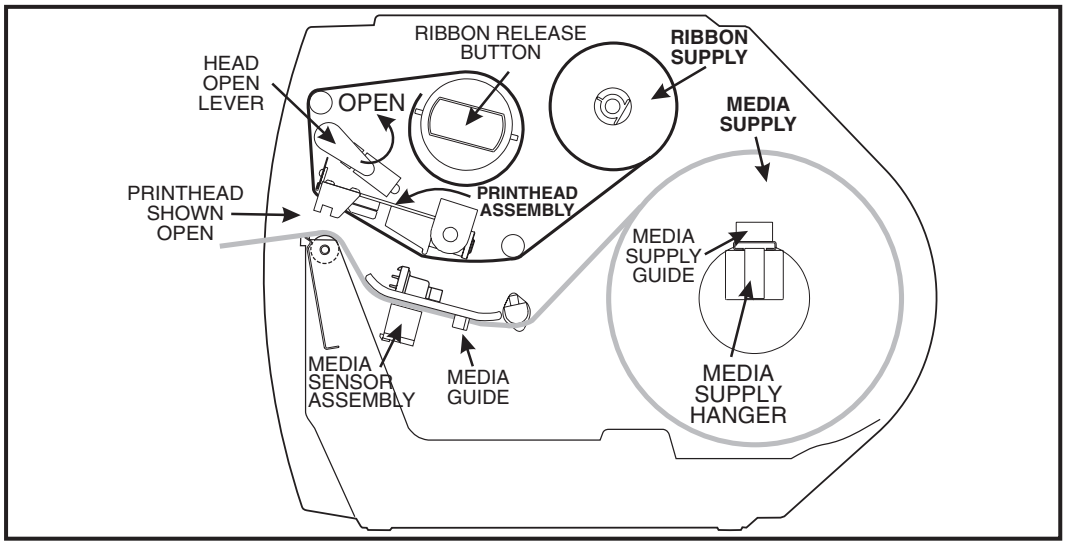

Figure 3 Roll Media Loading in Tear-Off Mode

Media and Ribbon

Loading Media

NOTE: A Media Calibration must be performed when media and ribbon (if used) are first installed in the printer, or when a different type of media or ribbon is installed. See page 14.

Media widths and thicknesses vary between applications. To maintain print quality from one application to another, refer to the Print Quality Adjustments section starting on page 33.

To load media, see Figures 3 through 6 and follow the loading procedure for your application.This section details the media and ribbon loading instructions for the printer. For detailed descriptions of the operating modes, see Chapter 2.

Tear-Off Mode Media Loading

Figures 3 and 4 illustrate the method of loading media for operation in Tear-Off Mode.

First, move the Head Open Lever counterclockwise to the OPEN position and raise the Printhead. Slide the Media Guide and the Media Supply Guide as far out from the printer frame as possible.

Roll Media Loading

Place the media roll on the Media Supply Hanger, and thread the media through the Printhead Assembly as shown in Figure 3. Adjust the Media Supply Guide and the Media Guide against the outer edge of the media. These guides must not cause pressure or excessive drag on the media. CLOSE the Head Open Lever, and see page 10 to adjust the Media Sensor position.

Fanfold Media Loading

Fanfold media, from outside the printer, feeds through either the bottom or rear access slot.

To load fanfold media, thread the media through the Printhead Assembly as shown in Figure 4. Adjust the Media Supply Guide and the Media Guide against the outer edge of the media. These Guides must not cause pressure or excessive drag on the media. CLOSE the Head Open Lever, and see page 10 to adjust the Media Sensor position.

Cutter Mode Media Loading *(Cutter Option Required)*

Figure 5 illustrates a Stripe printer equipped with the Cutter Option.

To ensure proper media loading, follow the directions for the Tear-Off Mode with the exception that the end of the media must be positioned on top of the Platen Roller. See Figure 5.

With the end of the media positioned directly on top of the platen roller, CLOSE the Head Open Lever. The printer will automatically feed out and cut one label when the printer is powered on.

External Rewind Mode Media Loading

> ***NOTE:*** *The Peel-Off Option is designed for the Peel-Off Mode only. It is not designed as an internal media rewind feature.*

This operating mode requires an External Rewinder. Media loading is the same as for the Tear-Off Mode of operation. If an External Rewinder is used, follow the manufacturer's operating instructions for that unit.

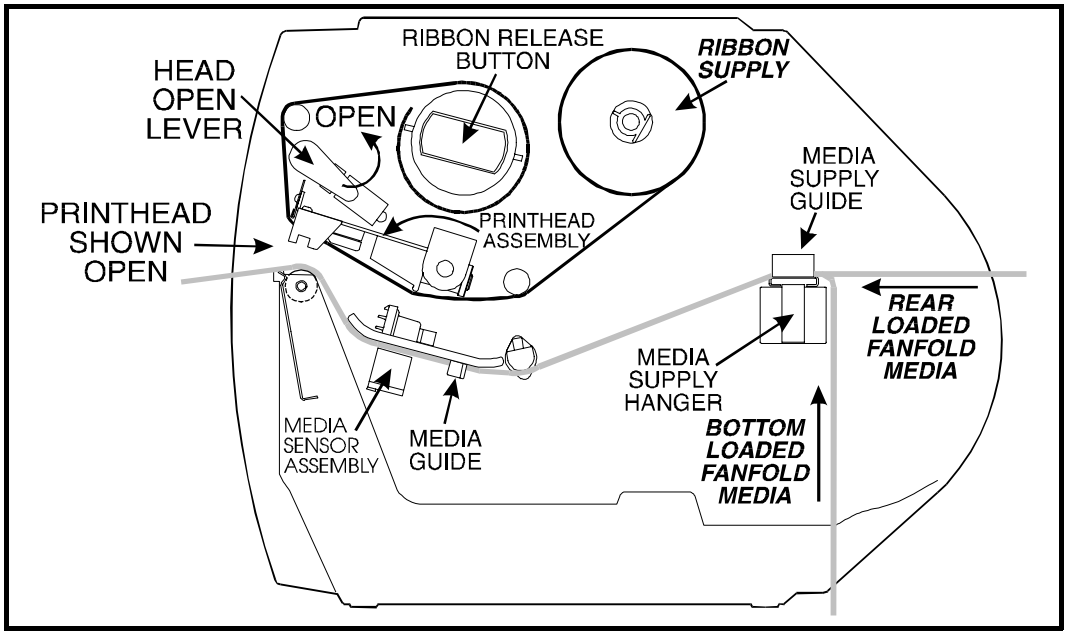

Figure 4 Fanfold Media Loading in Tear-Off Mode

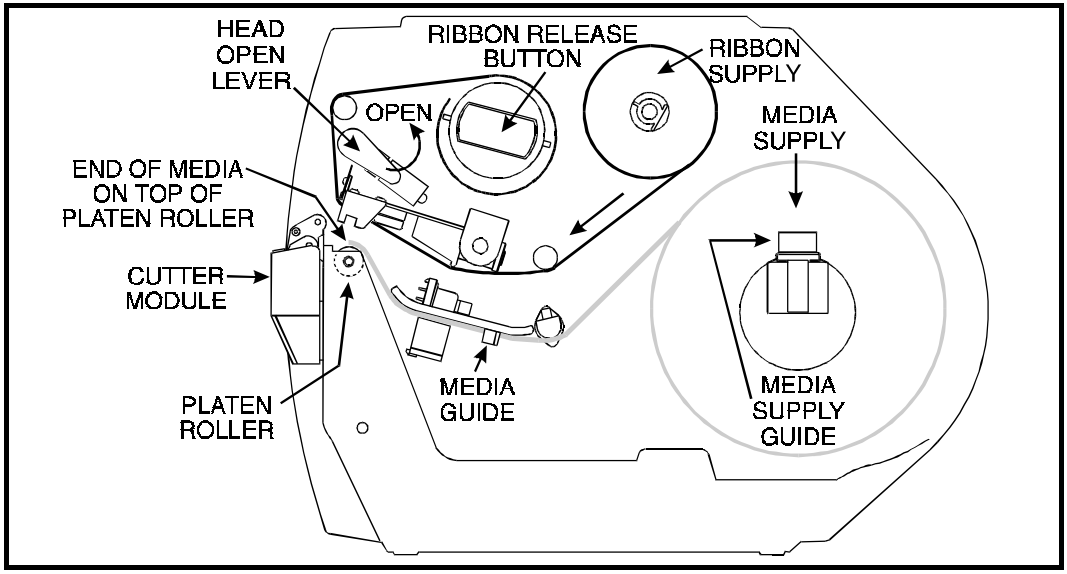

Figure 5 Cutter Mode Media Loading

Peel-Off Mode Media Loading *(Peel-Off Option Required)*

Figure 6 illustrates an S-500 printer with the Peel-Off Option.

To insure proper media loading, see Figure 6 and follow the procedure below.

1. Slide the Media Supply Guide, Media Guide, and the Outer Edge Guides on both the Platen Guide Rod and the Lower Guide Rod as far out from the Printer Frame as possible.
2. Open the Head Open Lever and raise the Printhead Assembly.
3. Remove the Hold Down Hook.
4. Thread the media through the printhead as shown in Figure 6.
5. From the front of the printer, pull the media through the Printhead Assembly until approximately 24" of media extends out from the printer. Remove the labels from the backing of the 24" of media that extends from the front of the printer.
6. Align the inside edge of the media with the Edge Guide Mark near the left side of the Tear-Off/Peel-Off Plate, then close the Head Open Lever. (See Figure 15 on page 22 for a detailed illustration.)
7. Thread the backing behind the Lower Label Available Sensor, through the slot under the Rewind Power Roller, and below the Lower Guide Rod to the Backing Rewind Spindle. Then wind the backing material around the Backing Rewind Spindle 3 or 4 times in a counter-clockwise direction. To insure proper winding, press the edge of the backing material against the round plate at the far end of the Spindle.
8. To hold the media against the Spindle, place the Hold Down Hook over the backing and insert both ends into the small slots in the round plate at the far end of the Spindle. Again, rotate the Backing Rewind Spindle counterclockwise to remove any slack in the backing material.
9. Adjust all of the Guides:
    - Push the Media Supply Guide inward until it is just touching the outer side of the Media Supply Roll, then lock the guide in place with its locking screw. (The Guide must not cause pressure or excessive drag on the Media Supply Roll.)
    - Adjust the Outer Edge Guides on both the Lower Guide Rod and the Platen Guide Rod until they just touch the outer edge of the media and backing without causing the material to buckle.
    - Adjust the Media Guide until it just touches the outer edge of the media without causing the material to buckle.
10. See page 10 to adjust the Media Sensor.

In the Peel-Off Mode, proper media tracking is critical. Refer to the Backing Rewind Power Roller Adjustment on page 35 to make sure that the media tracks properly through the printer.

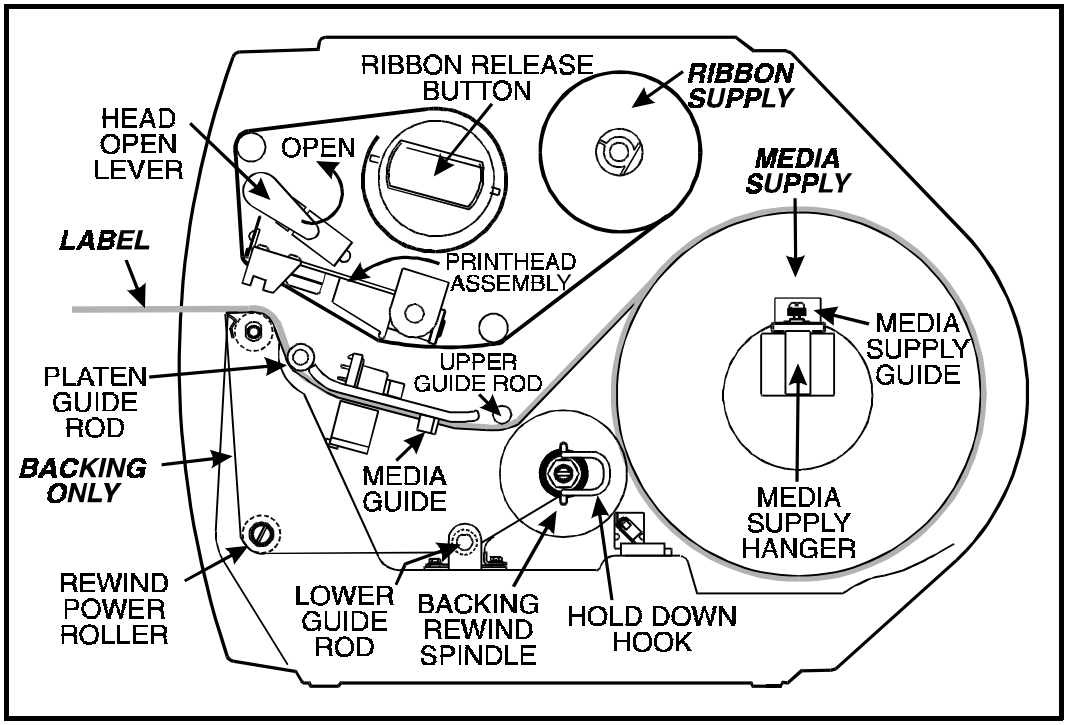

Figure 6 Peel-Off Mode Media Loading

Removing the Label Backing Material (Peel Off Option Required)

When the amount of backing wound on the Backing Rewind Spindle reaches full capacity, the Backing Rewind Spindle Full Sensor activates, the Paper/Ribbon light flashes, and printing pauses.

To remove the backing material, follow these steps (you don't need to turn the printer Power OFF for this procedure):

1. Unwind about 24" of backing from the Backing Rewind Spindle and cut it off at the spindle.
2. Pull out the Hold Down Hook and slide the backing material off of the Spindle and discard.
3. Feed the new starting edge of the backing through the mechanism and attach it to the Backing Rewind Spindle as described in the loading procedure.
4. While holding the media in position against the Tear-Off/Peel-Off Plate, Open and Close the Printhead without disturbing the media position. The printer is now ready to print more labels.

Adjusting the Media Sensor

When the Stripe printer is powered ON, it performs a self test and configures its operating characteristics. Some of these characteristics are determined by the position of the Media Sensor. See Figure 7.

The Media Sensor Assembly consists of two sections. The media passes between a stationary light source and a movable light sensor. The light source is positioned below the media, while the light sensor is positioned above the media.

This adjustment aligns the position of the light sensor with the notch or edge of the label.

With the Printhead OPEN, look through the front of the print mechanism and locate the Media Sensor Adjustment Lever. Reposition the sensor until the top of the adjustment lever is in line with the notch in the media. CLOSE the printhead by moving the Head Open Lever to the CLOSED position.

When continuous media (no notch or opening to sense) is used, position the Media Sensor anywhere over the media so that an "Out-of-Media" condition will still be sensed.

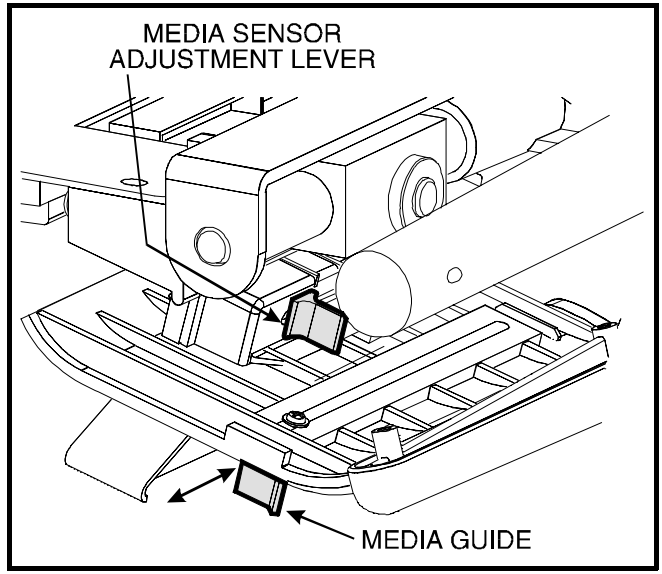

Figure 7 Media Sensor Adjustment

Non-Continuous Media

This type of media has some type of physical characteristic (web, notch, perforation, etc.) which indicates the start/end of each label.

The Media Sensor must be properly positioned to sense these indicators. See "Adjusting the Media Sensor" (above).

Continuous Media

Since continuous media does not contain label start/end indicators, you must tell the printer via software how long each label is. If you are using ZPL or ZPL II, include a Label Length (^LL) instruction in each label format you send to the printer (refer to your ZPL II Programming Guide). If you are using other software to drive your printer, refer to the instructions provided with that software.

Even with continuous media, you still need to position the Media Sensor in the middle of the media to sense when you run out of media.

Ribbon Loading

Adjusting the Ribbon Supply Spindle

Ribbon Supply Spindle: Normal Position

In the Normal Position, the "Dual-Tension" Ribbon Supply Spindle provides the desired amount of ribbon back-tension for different ribbon widths.

To place the Spindle in the Normal Position, firmly pull the Spindle End-Cap until it clicks into place, as shown in Figure 8.

Ribbon Supply Spindle: Low-Tension Position

Low-Tension Position is used in *limited applications* with ribbons wider than 2.4" (60 mm) to provide lower ribbon back-tension. Low-Tension Position is only recommended when normal tension hampers the ribbon movement.

To put the Spindle in the Low-Tension Position, firmly push the Spindle End-Cap until it clicks into place, as shown in Figure 8.

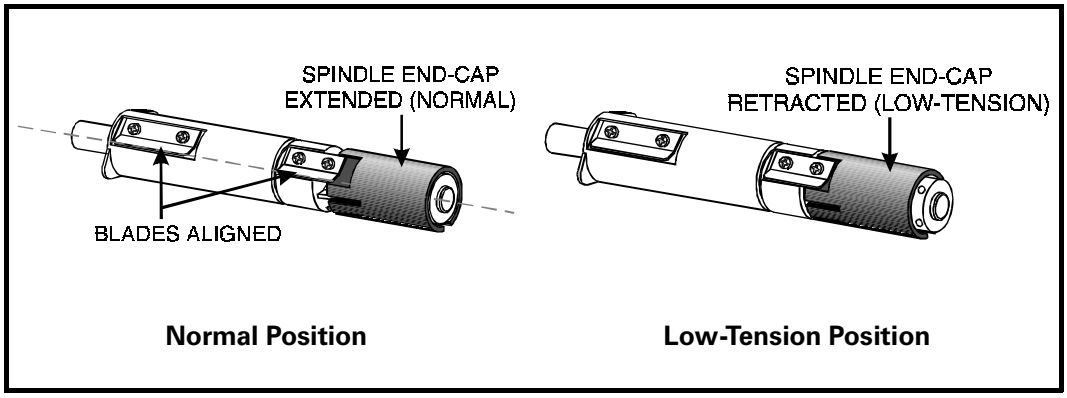

Figure 8 Ribbon Supply Spindle Adjustment

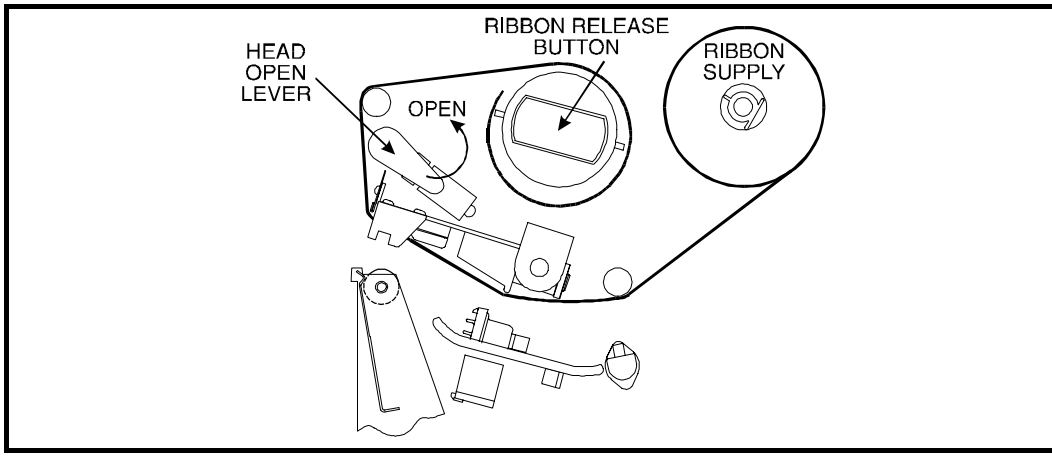

Figure 9 Ribbon Loading Diagram

Loading the Ribbon

To load ribbon, see Figure 9 and follow the procedure below.

> **Note:** *Use ribbon that is wider than the media. The smooth backing of the ribbon protects the printhead from wear and premature failure due to excessive abrasion.*
>
> *For Direct Thermal Print Method, ribbon is not used and should not be loaded in the printer when performing the Media Calibration.*

1. Adjust the Ribbon Supply Spindle position for normal or low tension. (see page 11).
2. Align the blades on the two sections of the spindle as shown in Figure 8. (You do not need to do this if your ribbon width is 2.4" (60 mm) or less.)
3. Place the ribbon roll on the Ribbon Supply Spindle.
4. Open the Printhead by moving the Head Open Lever counterclockwise to the OPEN position.
5. Thread the ribbon as shown without creasing or wrinkling it. Wind the ribbon onto the Ribbon Takeup Spindle for several turns in a clockwise direction.
6. Close the Printhead by moving the lever clockwise to the CLOSED position.

Ribbon Removal

Cut the ribbon where it is stretched between the Upper Ribbon Guide Arm and the Takeup Spindle. To remove ribbon from the Takeup Spindle, press the Release Button and slide the ribbon off the Spindle.

Initial Printer Test

To insure proper sensing of the media and ribbon, perform a Media Calibration. This procedure establishes the media parameters for the printer. If loading the printer with media and ribbon for the first time, or changing the type of media, perform the Media Calibration on page 14.

Configuration and Calibration

Option Switches (Only for Serial-Interface Printers)

> **Note:** *A printer with a parallel interface does not require these configuration parameters and therefore has no switches.*

A printer with the RS-232 serial interface has eight miniature switches, which are located inside the rear access opening above the Signal Interface Cable Connector.

You need to position these switches to match the settings of your host computer in order to establish communications between the two devices. If you do not know how to determine the settings on your host computer, refer to the directions in the instruction manual provided with the computer.

If these switches are in the proper position to match the communication configuration of the host computer, and the printer is not receiving data, see the Appendix to make sure you are using the correct interface cable.

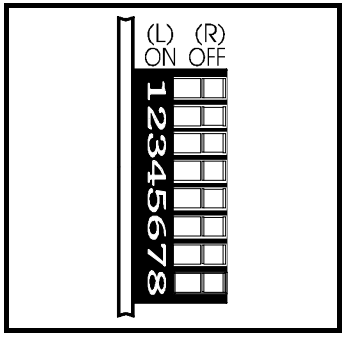

Figure 10 Option Switches

Option Switch Settings	
An "R" means the switch is OFF (positioned to the right), while an "L" means the switch is ON (positioned to the left). Zebra sets all switches to OFF when the printer is manufactured.	
Switch 3 2 1	**Baud Rate**
R R R	9600 Baud
R R L	19200 Baud
R L R	110 Baud
R L L	300 Baud
L R R	600 Baud
L R L	1200 Baud
L L R	2400 Baud
L L L	4800 Baud
Switch 4	**Data Bits** (Must be set to 8 data bits for Code Page 850.)
R	7 Data bits
L	8 Data bits
Switch 6 5	**Parity**
R R	Even parity
R L	Parity disabled
L R	Odd parity
L L	Parity disabled
Switch 7	**Communication Handshake Control**
R	XON/XOFF control
L	DTR/DSR control

Configuration Mode

The Configuration Mode allows you to fine-tune the internal printer configuration settings for your application. In this mode, you can change the following parameters:

- Printing darkness
- Rest position of the media with respect to the "web" or "interlabel gap"
- Position of printing relative to the top of the label
- Media and Ribbon Sensor values
- Label length
- Printing method
- Media type (continuous or non-continuous)

You can get a printout of the printer configuration (the values for each of these parameters) at any time by performing the CANCEL Key Self Test (see Chapter 4).

If it is ever necessary to reset the printer configuration to the factory defaults, refer to the "FEED Key and PAUSE Key" Self Test description in Chapter 4.

The ZPL II Programming Guide contains information on instructions which may be sent to the printer to disable the MODE key and set specific label format values for each of these parameters. If you are not using ZPL II, refer to the instructions provided with the software you are using to determine if your software also allows you to change these parameters.

Media Calibration

IMPORTANT: *Perform the Media Calibration Procedure when media is first installed, when a different type of media or ribbon is installed, or when print mode is changed.*

During this procedure, the printer automatically determines the media type, label length, media and ribbon sensor settings, and printing method. Media type is determined by sensing either continuous or non-continuous media as blank labels move through the printer. If non-continuous media is sensed, Label Length is also calibrated. If ribbon is sensed, the Thermal Transfer Print Method is configured; otherwise, the Direct Thermal Print Method is configured.

The results of this calibration are stored in the printer's memory and are retained even if printer power is removed. These parameters remain in effect until the next calibration is performed.

NOTE: *If the printer is in the Peel-Off Mode, the operator must "catch" the labels as they are peeled away from the backing during this procedure.*

1. Load media and ribbon (if used). Make sure the Media Sensor is properly positioned.
2. Place the Head Open Lever in the OPEN position.

3. Turn the power switch ON. When the Power ON Self Test is complete, the POWER and PAUSE lights will be ON and the PRINTHEAD light will FLASH.
4. Press the MODE key 3 times briefly. PAUSE and CALIBRATE lights turn ON.
5. Close the Head Open Lever.
6. Press UP to calibrate. The printer feeds some media. The MODE lights will flash ON and OFF to indicate that the settings have been saved in memory.
7. Press PAUSE to exit the PAUSE mode. The PAUSE light turns OFF.

Adjust the Print Darkness

This procedure sets the darkness of the printing on the label. To maximize the life of the printhead, use the lowest setting which provides the necessary print quality.

1. Press the MODE key. PAUSE and DARKEN lights turn ON.
2. Press UP or DOWN to adjust the current setting.
3. Press the MODE key 3 times briefly. The MODE lights will flash ON and OFF to indicate that the settings have been saved in memory.
4. Press PAUSE to exit the PAUSE mode. The PAUSE light turns OFF.

Adjust the Media Rest Position

This procedure sets the end-of-label position relative to the Tear-Off Plate or Cutter. Adjust this if your label is not being torn or cut at the correct point.

1. Press the MODE key twice briefly. PAUSE and POSITION lights turn ON.
2. Press UP or DOWN to adjust the current setting.
3. Press the MODE key twice briefly. The MODE lights will flash ON and OFF to indicate that the settings have been saved in memory.
4. Press PAUSE to exit the PAUSE mode. The PAUSE light turns OFF.

Adjust the Position of the Top of the Label

This procedure positions the printing on the label relative to the top edge of the label. Adjust this if your printing is too close or too far away from the top or bottom edge of the label.

1. Press the MODE Key twice briefly then press and hold it for about 5 seconds until the lights change. The PAUSE, DARKEN, and CALIBRATE lights turn ON.
2. Press UP or DOWN to adjust the current setting.
3. Press the MODE key twice briefly. The MODE lights will flash ON and OFF to indicate that the settings have been saved in memory.
4. Press PAUSE to exit the PAUSE mode. The PAUSE light turns OFF.


Stryjo®

2 Operation

Operating Your Zebra Stripe Printer

Now that your printer is ready for operation, how does it work? The Zebra Stripe Printer is designed to receive instructions from a host computer, such as an IBM-compatible PC. To create a label, you will either need to write a format in ZPL II, which is a programming language for creating label formats, or you will need to use a software program designed to format labels for the Zebra Stripe Printer. If you are using label design software, refer to the instructions provided with your software package to determine how to proceed.

If you are using, or plan to use, ZPL II programming language to format your labels, make sure you have a copy of the ZPL II Programming Guide. This free guide was available at the time you ordered your printer, but if you do not have a copy then refer to the mail- or fax-in card in the front of this book to get a copy. For some sample ZPL II label formats, refer to the section at the end of this chapter. But first, we'll describe the different operating modes.

Printer Operating Modes

The Stripe printer can be configured in several different operating modes by sending the proper commands from the host computer.

Tear-Off Mode

When the media is in the rest (idle) position, the webbing between labels is over the Tear-Off/Peel-Off Plate. To print a label, the printer first backfeeds the media until the start of the label is directly under the printhead then prints the entire label.

To print a large quantity of labels, send a format for printing a batch of labels to the printer; the printing will continue until all labels have been printed.

Peel-Off Mode *(Factory-Installed Peel-Off Option Required)*

When the media is in the rest (idle) position, the start of the label to be printed is slightly in front of the printhead. To print a label, the printer first backfeeds the media until the start of the label is directly under the printhead, then prints the entire label.

In this mode, once the label is printed, the media passes over the Tear-Off/Peel-Off Plate at a sharp angle. The backing material is peeled away from the label and winds around the Backing Rewind Spindle. The media feeds forward until most of the label hangs loose from the backing. The Label Available Sensor detects this label and pauses printing until the operator removes the label, then the next label prints.

The Backing Rewind Spindle will hold one-half of the backing from a standard-size media roll. The Rewind Spindle Full Sensor detects when the spindle is full and pauses

printing. The PAPER/RIBBON light flashes to indicate this condition. To remove the backing from the Rewind Spindle, see page 9.

Cutter Mode *(Factory-Installed Cutter Option Required)*

When the media is in the rest (idle) position, the start of the label to be printed is directly under the printhead. The printer prints the entire label and automatically cuts the label after it is printed. The Cutter Catch Tray "catches" the completed labels.

The Cutter automatically cycles through one cutting motion when the printer's power is turned ON. When printing labels, the Cutter activation is determined by a command sent to the printer by the host computer, either a ZPL II command or a command from a different software driver. To disable the cutter, turn the printer's Power Switch OFF and simply unplug the connecting cable from the bottom of the Cutter Module.

> ***Note: Do not*** *exchange Cutter Modules between different printers. The Cutter Module adjustments are optimized during installation to work with a particular printer, and may not perform correctly if the Module is placed on a different unit.*

External Rewind Mode *(External Rewinder Required)*

Some applications call for the media to be rewound onto a core as the labels are printed. The Stripe printer, however, *does not* have an internal Media Rewind capability—the Backing Rewind Spindle *is not* designed to rewind label stock. You will need an external rewinder for this application.

When the media is in the rest (idle) position, the start of the next label is directly under the printhead. After the label is printed, the media feeds forward until the start of the next label is under the printhead. The media never backfeeds in this mode. When the printer completes a batch of labels, printing will stop. The speed and tension of the rewind operation is strictly a function of the external rewind unit.

Operator Controls

This section discusses the functions of the various controls and indicators on the Stripe printer. The operator should become familiar with each of these functions.

AC Power ON/OFF Switch

This switch is located on the left side of the printer near the AC Power Cord and Fuse. See Figure 1. The AC Power Switch should be turned OFF (0) before connecting or disconnecting any cables.

Turning the switch ON (1) activates the printer and causes it to perform a Power ON Self Test as it begins operation. Turning the printer power ON while holding down certain front panel keys will launch additional Printer Self Tests following the Power ON Self Test. See Chapter 4.

External influences such as lightning storms or unwanted noise on the power or data cables may cause erratic printer behavior. Turning the AC Power OFF and back ON may re-establish proper printer operation.

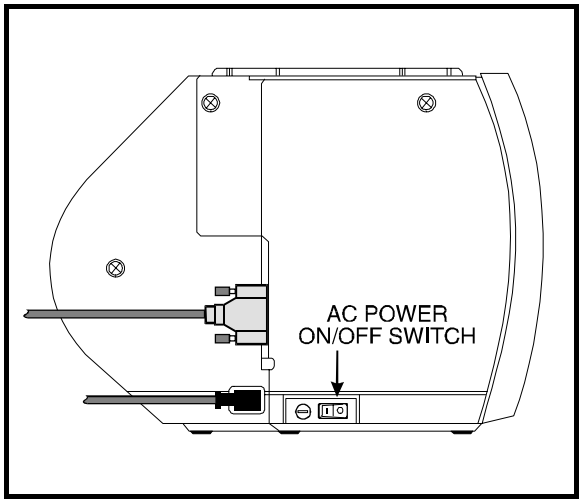

Figure 11 AC Power ON/OFF Switch

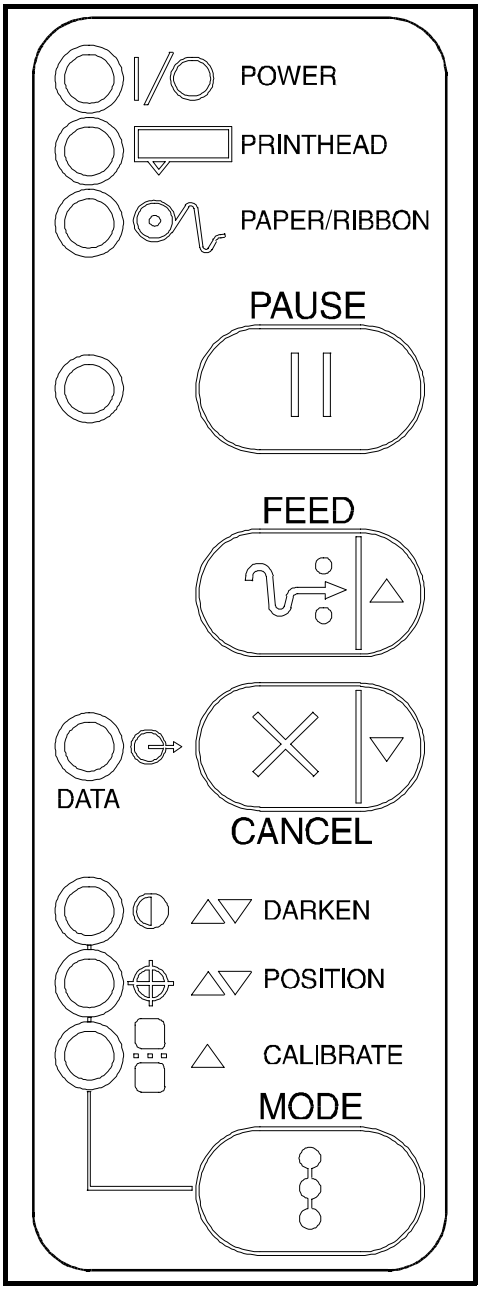

Figure 12 Zebra Stripe Printer Front Panel

Front Panel Keys

PAUSE Key	Starts and stops the printing process. - If the printer is not printing: no printing can occur - Printing: printing stops once the current label is complete
FEED Key	Forces the printer to feed one blank label. - Printer not printing: one blank label feeds immediately - Printing: one blank label feeds after the current batch of labels is complete
CANCEL Key	When in the PAUSE mode, this key will cancel print jobs. - No print jobs in queue: press to cancel the next print job to be sent to printer - Print job in queue: press once to cancel current print job - Press and hold for several seconds (3) to cancel all print jobs in the printer's memory. The Data Light will turn OFF.
MODE Key	- Puts printer in Configuration Mode. - Activates automatic Media Calibration procedure.

Front Panel Lights

NOTE: *If an operating condition which causes a light to be ON constantly and one which causes the same light to flash occur at the same time, the light will flash.*

Light	Status	Indication
POWER	OFF	Printer is OFF, or not receiving power.
	ON	Printer is ON.
PRINTHEAD	OFF	Normal operation.
	ON	Head Over Temperature condition. Printing stops until the printhead cools down. Printing resumes automatically.
		Printhead Under Temperature condition. Printing continues.
	Flashing	Printhead Open.
PAPER/ RIBBON	OFF	Media and ribbon (if used) are properly loaded.
	ON	Paper out.
	Flashing	In Thermal Transfer Mode: Ribbon is out.
		In Direct Thermal Mode: Ribbon is in printer.
		In Peel-Off Mode: backing rewind spindle is full.
PAUSE	OFF	Normal operation.
	ON	Printer has stopped all printing operations.
DATA	OFF	Normal operation, no data being received.
	ON	Labels are printing.
	Single flash	The CANCEL key was pressed and a format was successfully deleted from the print queue.
	Flashing	Receiving data from host computer.
	Slow flashing	Printer sent a "stop transmitting" command to the host computer.
DARKEN	ON	Printer is in the Configuration Mode. See Chapter 1 for more information.
POSITION	ON	
CALIBRATE	ON	

Printer Status Sensors

The Zebra Stripe Printer contains several status sensors. These sensors alert the operator to various conditions by either stopping the printing or turning on a light.

Sensor	What it monitors	How it works
Printhead Sensor	Checks the open/closed status of the Printhead lever.	If the printhead is open, the Printhead Light flashes.
Media Sensor (See Chapter 1 to adjust this sensor.)	Checks for proper media loading.	If you run out of paper, the Paper/Ribbon Light will turn ON.
	If non-continuous media is used: Sets label length for individual labels.	
Ribbon Sensor	Monitors the presence of ribbon.	If you run out of ribbon, the Paper/Ribbon Light flashes.
Label Available Sensor (Peel-Off Option Required. See Fig. 15.)	In Peel-Off Mode, it checks to see if a label is available.	Once a label prints, it will pass between the two parts of this Sensor and cause the printer to pause. When the label is removed, printing resumes.
Backing Rewind Spindle Full Sensor (Peel-Off Option Required. See Fig. 14.)	Senses when the Backing Rewind Spindle is full of used backing material.	When the Spindle is full, the Paper/Ribbon Light flashes.

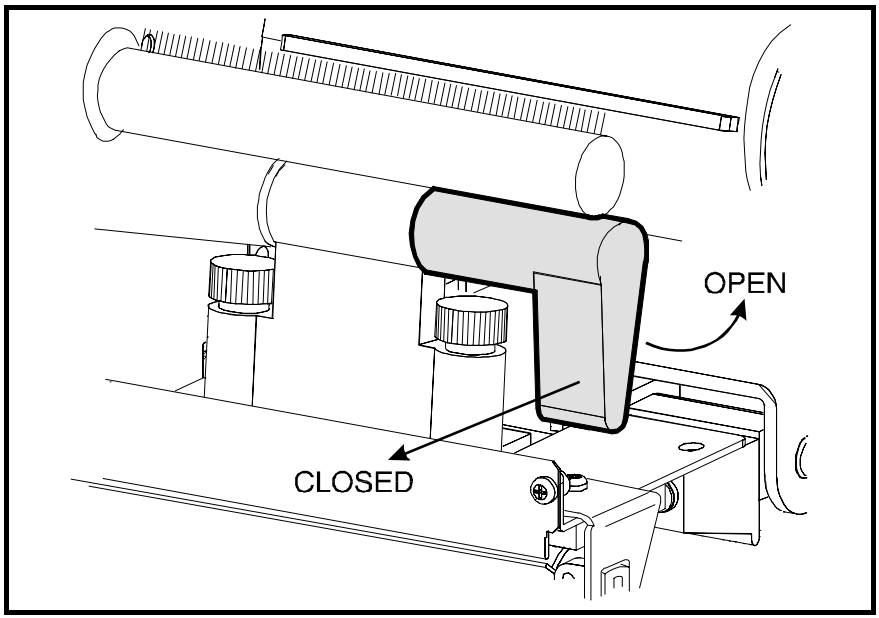

Figure 13 Printhead Position

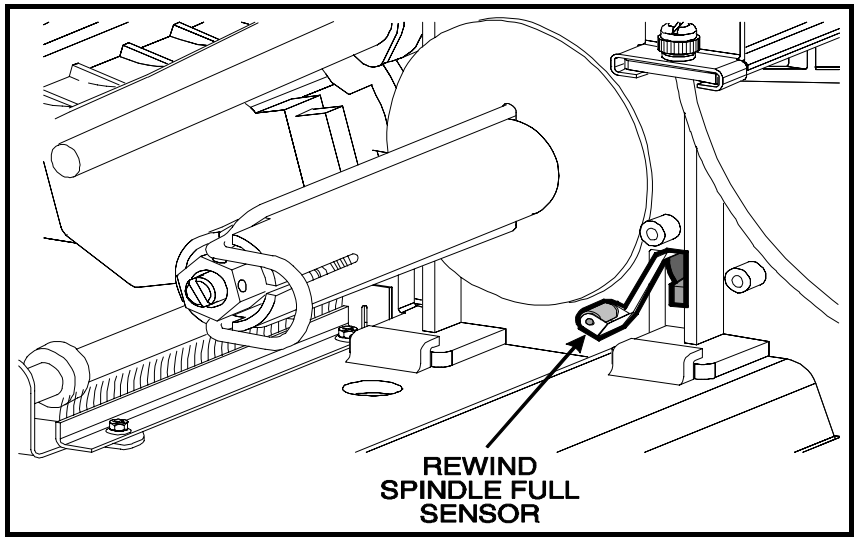

Figure 14 Backing Rewind Spindle Full Sensor Position

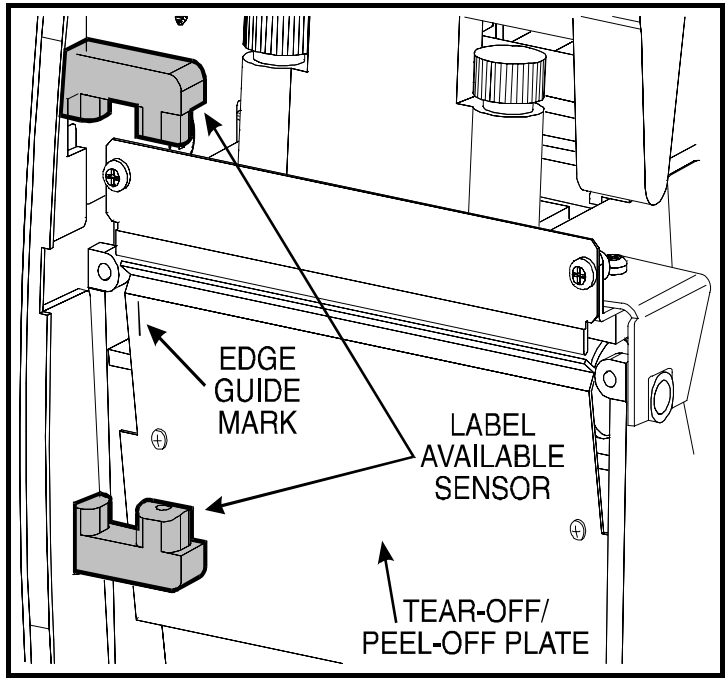

Figure 15 Label Available Sensor Position

Sample ZPL II Label Formats

ZPL II® is Zebra Technologies Corporation's Zebra Programming Language II label design language. ZPL II lets you create a wide variety of labels from the simple to the very complex, including text, bar codes, and graphics.

This section contains three sample label formats for you to begin experimenting with. It is not intended as an introduction to ZPL II. To learn about ZPL II, send in the request card at the beginning of this book for a free copy of the ZPL II Programming Guide.

For each format, do the following:

1. Save the file.
2. Copy the file to the printer.
   - Set-up the printer and turn the Power ON.
   - Use a text editing program (ex: Windows Write or DOS Editor) and type in the label format exactly as shown in the sample label format shown below.
   - Save the file in a directory for future use. Use the extension " . zpl".
   - Copy the file to the Zebra Stripe Printer.

   Note: *Typically, computers running DOS use the "COPY" command to send a file to the Zebra printer. For example, if your file name is "format1.zpl" then type, "*COPY FORMAT1.ZPL COM1*".*

3. Compare your results with those shown. If your printout does not look like the one shown, confirm that the file you created is identical to the format shown, then repeat the printing procedure. If nothing prints, refer to Chapter 1 to make sure your system is set up correctly, otherwise refer to Chapter 4, "Troubleshooting and Diagnostics".

Format 1: Simple Text and a Barcode

Line #	Type this label format:	You'll get this printout:
1 2 3 4 5	^XA ^LH30,30 ^FO20,10^AD^FDZEBRA^FS ^FO20,60^B3N,Y,20,N^FDAAA001^FS ^XZ	ZEBRA 

Line #1: Indicates start of label format.
Line #2: Sets label home position (in dots) from the upper left-hand corner of the label.
Line #3: Sets field origin, selects font "D", defines field data as "ZEBRA".
Line #4: Sets field origin, selects bar code Code 39, sets barcode height at 20 dot rows, defines field data for bar code as "AAA001".
Line #5: End of label format.

Format 2: Saving a Label Format As a Graphic Image

Line #	Type this label format:	You'll get this printout:
1 2 3 4 5 6 7 8 9	^XA ^LH30,30 ^FO20,10^AD^FDZEBRA^FS ^FO20,60^B3N,Y,20,N^FDAAA001^FS ^ISFORMAT2,N ^XZ ^XA ^ILFORMAT2 ^XZ	(Same as Format 1, but this format was also saved in the printer's memory as a graphic image named "FORMAT2".) ZEBRA 
Line #1-4: These commands were described in Format 1. Line #5: Saves the format in the printer's memory as a graphic image named "FORMAT2", the "N" indicates "do not print after saving". Line #6-7: (See Format 1) Line #8: Load and print the graphic image saved as "FORMAT2". Line #9: (See Format 1)		

Format 3: Using a Serialized Data Field

Line #	Type this label format:	You'll get this printout:
1 2 3 4 5 6 7	^XA ^LH30,30 ^FO20,10^AD^FDZEBRA^FS ^FO20,60^B3,,40,,^FDAAA001^FS ^FO20,180^AF^SNSERIAL NUMBER 00000000111,1,Y^FS ^PQ10 ^XZ	ZEBRA  *AA001* SERIAL NUMBER 00000000111 *Ten labels should print. The first and last are shown here.* ZEBRA  *AA001* SERIAL NUMBER 00000000120
Line #1 - 3: These commands were described in Format 1. Line #4: Defines field data for bar code as "AAA001". Line #5: Defines serialized field, starting value of 111, increment by 1, insert leading zeros. Line #6: Sets print quantity to 10 Line #7: (See Format 1)		

3 Routine Care and Adjustment

Cleaning

CAUTION: Use only the cleaning agents indicated below. Zebra Technologies Corporation will not be responsible for any other fluids being used on this printer. **No lubricants are needed.**

Table 1 provides a brief cleaning schedule. Specific cleaning procedures are provided on the following pages.A Preventive Maintenance Kit (part # 01429) is available from Zebra. Kit items are also sold separately by the part numbers shown.

Preventive Maintenance Kit

Solvent (Alcohol), 4 oz. bottle (part # 01426)
Applicators, bag of 100 (part # 01427)

Cleaning the Exterior

The exterior surfaces of the Zebra Stripe Printer may be cleaned with a lint-free cloth. Do not use harsh or abrasive cleaning agents or solvents. If necessary, a mild detergent solution or desktop cleaner may be used sparingly.

Cleaning the Interior

Remove any accumulated dirt and lint from the interior of the printer using a soft bristle brush and/or vacuum cleaner. Inspect this area after every roll of media.

AREA		METHOD	INTERVAL
Printhead		Alcohol	After every roll of media (or 500 feet of fanfold media) when printing direct thermal. After every roll of ribbon when printing in the thermal transfer mode.
Platen Roller		Alcohol	
Media Sensor		Air Blow	
Media Path		Alcohol	
Ribbon Path		Air Blow	
Upper Guide Rod (Peel-Off)		Alcohol	After every roll of media.
Platen Guide Rod (Peel-Off)		Alcohol	After every roll of media.
Rewind Power Roller (Peel-Off)		Alcohol	After every roll of media.
Lower Guide Rod (Peel-Off)		Alcohol	After every roll of media.
Cutter assembly (if used)	If using continuous pressure-sensitive media	Adhesive remover, such as "Goo-Gone"	After every roll of media or more often depending upon your application and media.
	If using tagstock or label backing material only	Alcohol and air blow	After every 2 or 3 rolls of media.
Tear-Off/Peel-Off Plate		Alcohol	Once Per Month.
Label Available Sensor		Air Blow	Once Per Six Months.

Table 1 Cleaning Schedule

Cleaning the Printhead

Inconsistent print quality, such as voids in the bar code or graphics, may indicate a dirty printhead. For optimum performance, Zebra recommends performing the following cleaning procedure after every roll of ribbon.

> ***NOTE:*** *It is not necessary to turn the printer OFF before cleaning the printhead. If power is turned OFF, all label formats and images, as well as any temporarily saved parameter settings stored in the printer's internal memory, will be lost. When power is turned back ON, it will be necessary to reload these items.*

To clean the printhead, refer to Figure 16 and follow these steps:

1. Open the Media Compartment Door and the Front Panel.
2. Open the Printhead by moving the Printhead Open Lever to the OPEN position.
3. Remove the media and ribbon (if present).
4. Moisten an applicator tip with Zebra Technologies Corporation recommended solvent and wipe along the print elements from end to end. (The print elements are the grayish/black strip just behind the chrome strip. See Figure 16). Allow a few seconds for the solvent to evaporate.
5. Rotate the platen roller and clean thoroughly with solvent.
6. Brush/vacuum any accumulated paper lint and dust away from the rollers and media sensors.
7. Reload ribbon and/or media, close and latch the printhead, close the Front Panel and the Media Compartment Door, and continue printing.

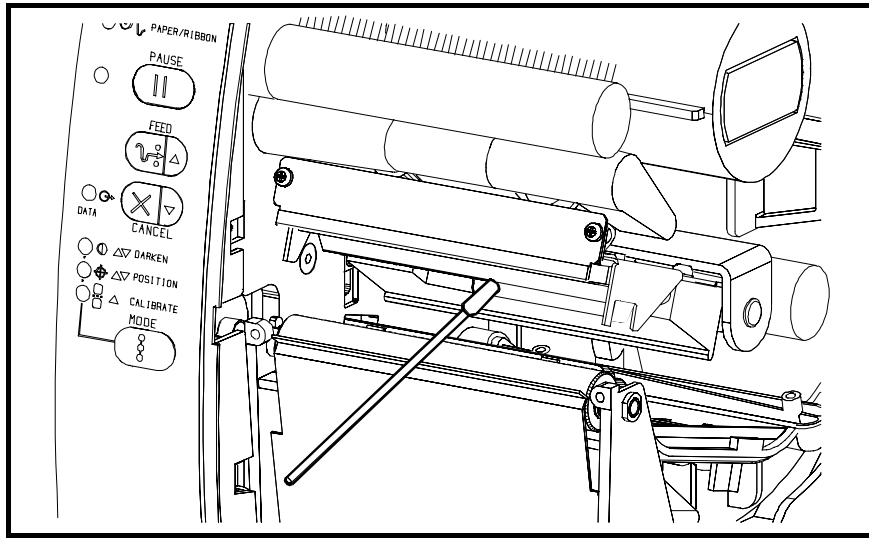

Figure 16 Printhead Cleaning

Cleaning the Cutter Module *(For Printers Equipped with the Optional Cutter)*

The Cutter Module requires periodic cleaning to remove paper dust and gummed label residue. The procedure on the following pages should be performed by the operator according to the schedule on page 25. However, depending on your application and media type you may need to clean the cutter more or less frequently.

NOTE: *In the figures shown, media and ribbon have been removed for clarity. It is not necessary to remove media or ribbon before performing the maintenance procedures described.*

IMPORTANT: *Do not exchange Cutter Modules between different printers. The Cutter Module adjustments are optimized during installation to work with a particular printer and may not perform correctly if the module is placed on a different printer.*

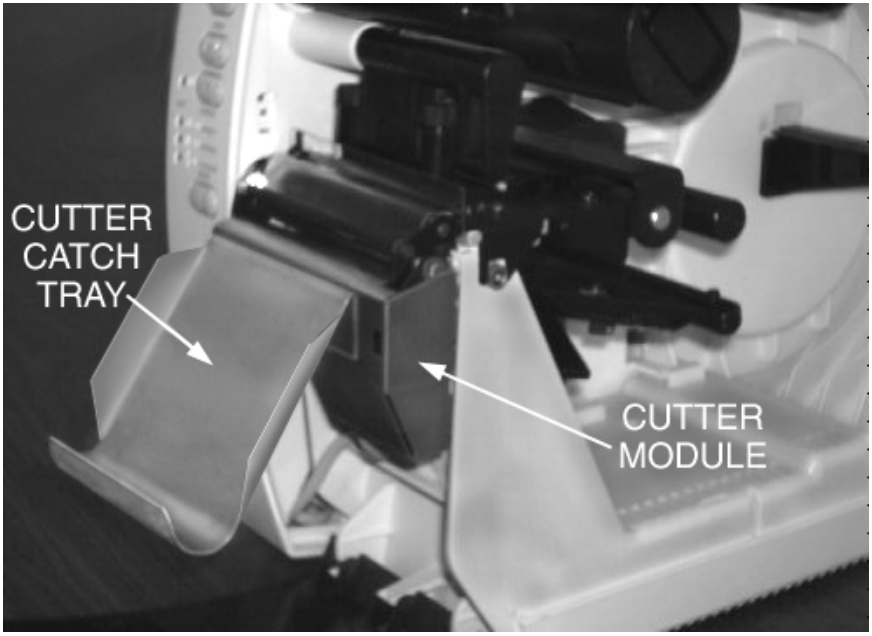

Figure 17 Cutter Module and Catch Tray Location

I. Remove the Cutter Module from the printer.	
1.	Turn the printer's AC power OFF.
2.	Raise the printer's Media Access Door and lower the printer's Front Door. See Figure 17.
3.	Remove the Label Catch Tray by lifting it up and away from the front of the Cutter Module.
4.	See Figure 18. Gently pull straight down on the Cutter Cable Connector to remove it from the mating socket on the Cutter Module.
5.	Turn the Cutter Mounting Screw (by hand or with a screwdriver) in a counter-clockwise direction until it is loose.
6.	See Figure 19. Hold the Cutter Module as shown. Apply gentle upward pressure to the left and right ends while raising the Cutter Module up and away from the Mounting Posts. If necessary, rock the Module side-to-side to loosen it.

This procedure is continued on the next page.

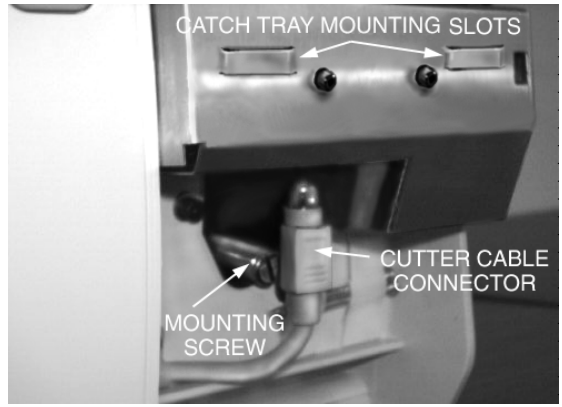

Figure 18 Cutter Connector and Mounting Screw

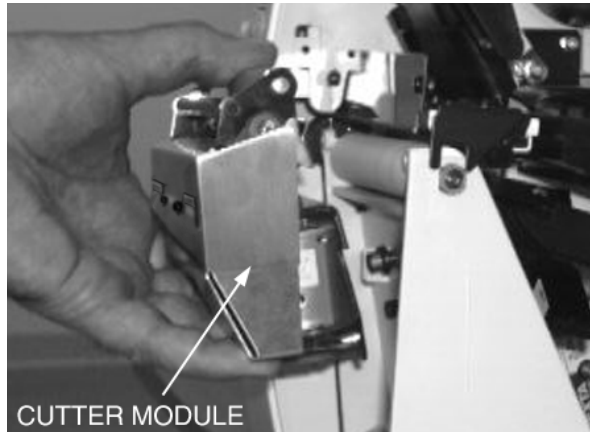

Figure 19 Cutter Module Removal

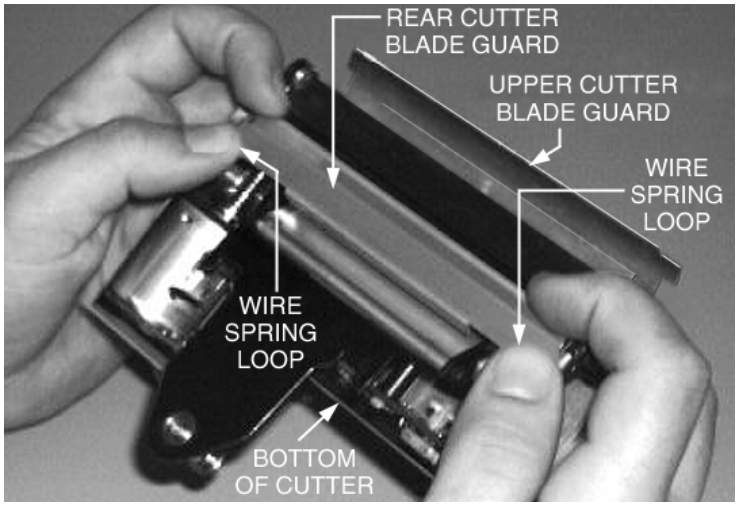

Figure 20 Cutter Module Disassembly

II. Disassemble the Cutter Module.	
1.	See Figure 20. Hold the Cutter Module as illustrated. Put your thumbs on the two Wire Spring Loops and your index fingers on the top of the Rear Cutter Blade Guard. It may help to lay the Cutter Module on a table or other surface throughout this process.
2.	To remove the Rear Cutter Blade Guard, first press down simultaneously on the two Wire Spring Loops. While pressing down on the loops, press the Rear Cutter Guard back toward you and over top of the Loops. (You're trying to tuck the Loops underneath the Blade Guard in this process.)
3.	Continue pressing the Rear Cutter Guard toward you and allow the back edge of the Guard to pop up as the Guard comes free from its holders. You may now remove the Rear Cutter Guard by lifting it off of the module. ***NOTE:*** *The Wire Springs may flip up out of position during this process. Springs will be repositioned during reassembly.*
4.	Observe the ends of the Rear Cutter Blade Guard and note the small metal pins protruding toward the inside. During the Reassembly Procedure, these pins will be mounted into the corresponding mounting slots in the Cutter Side Panels.
5.	To provide complete access to the area to be cleaned, raise the Upper Cutter Blade Guard as shown in Figure 20.

III. Clean the Cutter Module.	
1.	Remove any label material which has adhered to the Cutter parts and use a small brush to remove any paper dust from the Cutter Module.
2.	If you use pressure-sensitive media, use a lint-free cloth soaked in an adhesive remover to remove all gum and label residue from the Cutting Blades and Guards. If you use tag stock, use alcohol (part # 01426) to remove any dirt.

This procedure is continued on the next page.

IV. Reassemble the Cutter Module.	
1.	See Figure 22. Position the two Wire Springs down against the Lower Cutter Blade.
2.	Place the Rear Cutter Blade Guard over the Wire Springs, perpendicular to its final position. Place your thumbs on the top (flat) part of the Guard. ***NOTE:*** *Insure that the ends of the Rear Cutter Blade Guard are positioned on the outside of the Cutter Side Panels.*
3.	See Figure 22. Press the Rear Cutter Blade Guard down and forward, rotating the Guard as you proceed, to lock the mounting pins into position in the Cutter Side Panel mounting slots. Slide the Guard forward until the two Wire Spring Loops pop up on the back side of the Guard. ***NOTE:*** *Insure that the Wire Springs remain positioned under the Rear Cutter Blade Guard when assembly is completed.*
4.	Lower the Upper Cutter Blade Guard back to its normal position. When reassembled, the back of the Cutter Module should look like the one shown in Figure 23.

This procedure is continued on page 32.

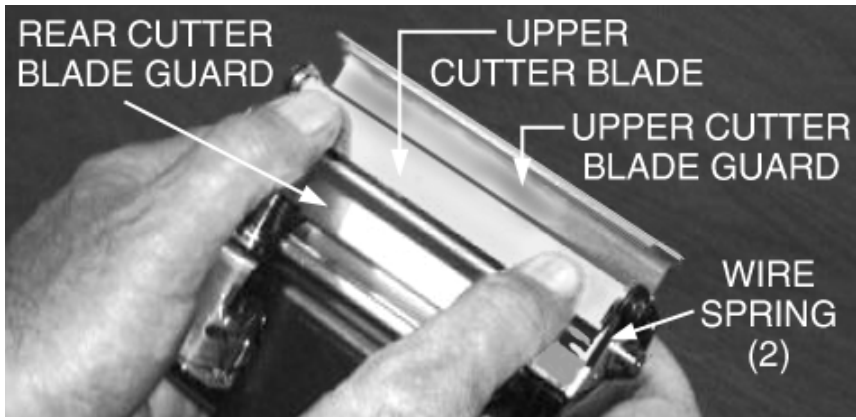

Figure 21 Cutter Module Reassembly

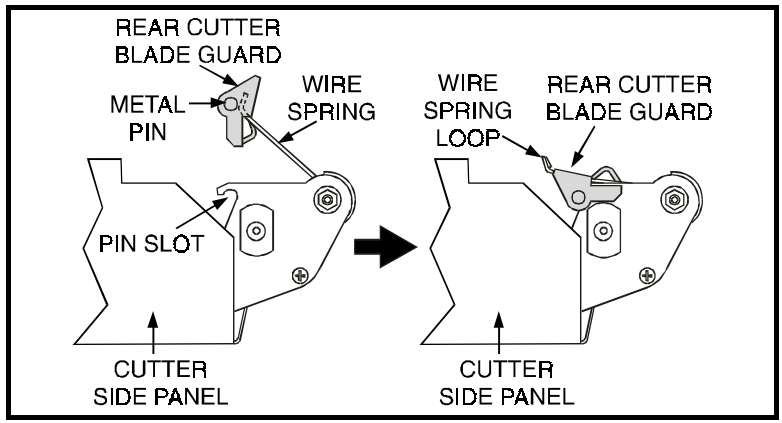

Figure 22 Side View of Cutter Module Reassembly

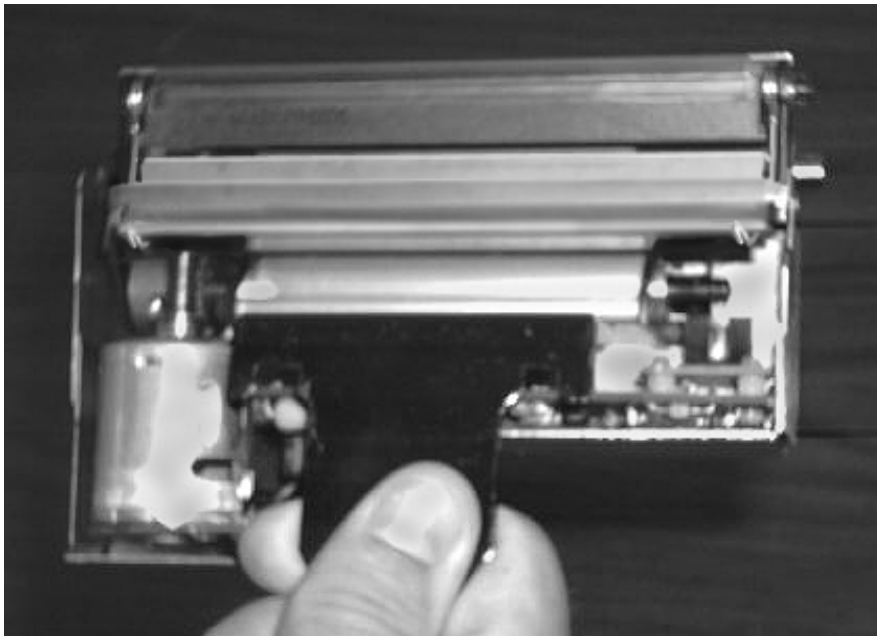

Figure 23 Reassembled Cutter Module

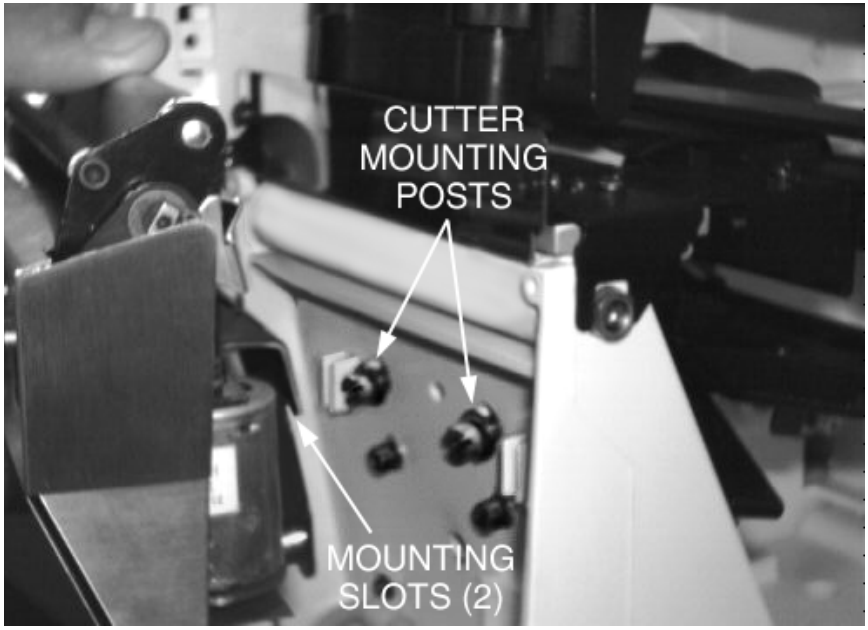

Figure 24 Cutter Module Reinstallation

V. Reinstall the Cutter Module.	
1.	See Figure 19. Position the Cutter Module above the Cutter Mounting Posts. Press down on the Cutter Module until the Mounting Slots engage the Mounting Posts on the printer.
2.	See Figure 18. Tighten the Mounting Screw in a clockwise direction to hold the Cutter Module in Position.
3.	See Figure 18. Position the Cutter Cable Connector so the flat side of the connector faces away from the printer, then insert it up into the mating connector on the Cutter Module.
4.	Replace the Cutter Catch Tray onto the two mounting posts located on the front of the Cutter Module.

VI. Test the Cutter Operation.	
1.	If necessary, reload ribbon and label stock into the printer, then close the printer's Front Door and Media Access Door. ***NOTE:*** *When loading media, make sure the end of the label is positioned on top of the Platen Roller, then close the Printhead Latch.*
2.	When the printer is turned ON, the Cutter Module will cycle through one cutting operation and be ready to print labels.
3.	OPTIONAL: Hold in the PAUSE key while turning the printer's AC power ON. When the Power ON Self Test begins (all lights ON), release the PAUSE key. When the Power ON Self Test ends, the printer will automatically print test labels which the Cutter Module will automatically cut.
End of Cutter Cleaning Procedure.	

Lubrication

No lubricating agents of any kind are required on this printer.
Some commercially available lubricants will damage the finish if used.

AC Power Fuse Replacement

A user-replaceable AC Power Fuse is located just to the left of the Power ON/OFF Switch. (See Figure 11 on page 19.) For a 110 VAC installation, the replacement Fuse is a 3AG Fast Blow style rated at 5 Amp/250VAC. For a 220 VAC installation, the Fuse is the same style but rated at 3 Amp/250VAC .

Before replacing the Fuse, turn the AC Power Switch OFF and unplug the AC Power Cable.

To replace the Fuse, insert the tip of a flathead screwdriver into the slot in the end of the Fuse Holder End Cap. Press in slightly on the End Cap and turn the screwdriver slightly counterclockwise. This will disengage the End Cap from the Fuse Holder and permit removal of the Fuse. To install a new fuse, reverse the sequence.

Mechanical Adjustments

The Stripe printer has been designed with minimal operator adjustments required.

Print Quality Adjustments

In the factory, the Stripe printer is aligned and tested using Zebra's 5319 ribbon and Zebra's Z-Trans 6A full width, non-continuous media to print thermal transfer labels at Speed C (4"/sec). For other media/ribbon combinations, the user may need to adjust Print Darkness, Toggle Pressure, or possibly the Printhead Position.

When changing from one media/ribbon combination to another, only slight changes in Print Darkness or Toggle Pressure may be required. For these situations, refer to the Toggle Pressure Adjustment on page 34. However, to achieve optimum print quality, perform the adjustment procedure which follows. A #2 Phillips screwdriver and a flathead screwdriver will be required.

I. Check the initial print quality.	
1.	Open the Media Compartment Door and Front Panel on the printer.
2.	Load the recommended media and ribbon for your application and adjust the Media Sensor Position.
3.	Send a label format to the printer or activate the PAUSE Key Self Test (see Chapter 4), print a few labels, and press the PAUSE key to stop printing.
4.	Observe the print quality of the test labels. If it is satisfactory, complete the process by turning the AC Power OFF. Otherwise, continue to Step II.

II. Adjust the print darkness.	
1.	Press the MODE key (DARKEN light and PAUSE light turn ON) to permit darkness adjustment.
2.	Press the PAUSE key to begin printing test labels.
3.	While observing the print darkness, repeatedly press the UP (FEED) key to make the printing DARKER, or the DOWN (CANCEL) key to make the printing LIGHTER, until the desired darkness is achieved.
4.	Once proper print darkness is achieved, press the PAUSE key to stop printing.

If you are still experiencing poor print quality, perform the Toggle Pressure Adjustment 34. If that doesn't correct your print problem, turn to the Appendix to adjust the printhead position.

Note: *Adjusting the position of the printhead should be done only after all of the above attempts have been made to correct the situation.*

Toggle Pressure Adjustment

The Toggle Assembly presses the printhead against the ribbon (if used), the media, and the platen.

The pressure applied by the Toggle Assembly may need to be increased or reduced when different thicknesses or widths of media are used in the printer.

Before increasing Toggle Pressure to achieve darker print darkness, perform the Print Quality Adjustments on page 33.

Turn the two knurled knobs on top of the Toggle Assembly to adjust the pressure. Turning clockwise will increase the pressure, and turning counter-clockwise will decrease the pressure.

Always use the lowest Toggle Pressure necessary to provide the desired print darkness on the label.

> ***NOTE:*** *When using media narrower than 4.5" wide (full media width), Zebra recommends reducing the pressure on the Right Hand Toggle until print quality is affected, then increase pressure just to the point where good print quality is achieved. This reduces the wear on those areas of the Printhead and the Platen where ribbon and media are not present. (For very narrow media, zero pressure from the Right Toggle may be required.)*

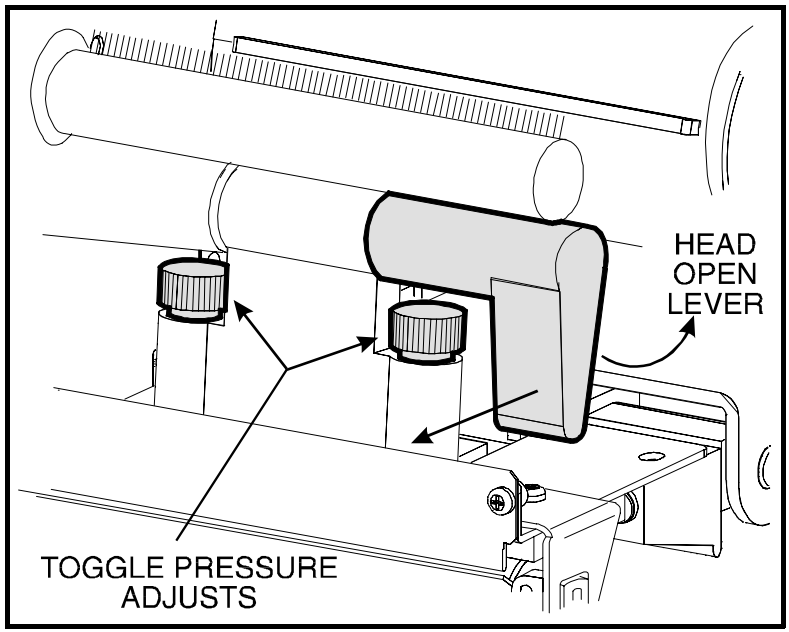

Figure 25 Toggle Pressure Adjustment

Media Sensor Position Adjustment

This procedure was covered in Chapter 1. See page 10.

Ribbon Supply Spindle Adjustment

This procedure was covered in Chapter 1. See page 11.

Backing Rewind Power Roller Adjustment *(Peel-Off Option Required)*

> ***NOTE:*** *This Roller is only present on printers with the Peel-Off Option. Zebra presets this Roller during manufacture for proper operation with most applications. Only adjust this Roller when necessary.*

In the Peel-Off Mode, proper media tracking is critical. The Rewind Power Roller automatically turns along with the movement of media, to insure continuous rewind of the label backing material. When adjusting this roller, the operating position may vary due to the type, width, and thickness of the backing material.

Before performing this adjustment, review the Media Loading procedure in Chapter 1. Insure minimal sideways movement during the printing process by positioning the left edge of the label backing even with the Edge Guide Mark on the Tear-Off/Peel-Off Plate. Position the outer Media Guides against the outside edge of the media, but not so tight as to bind the material.

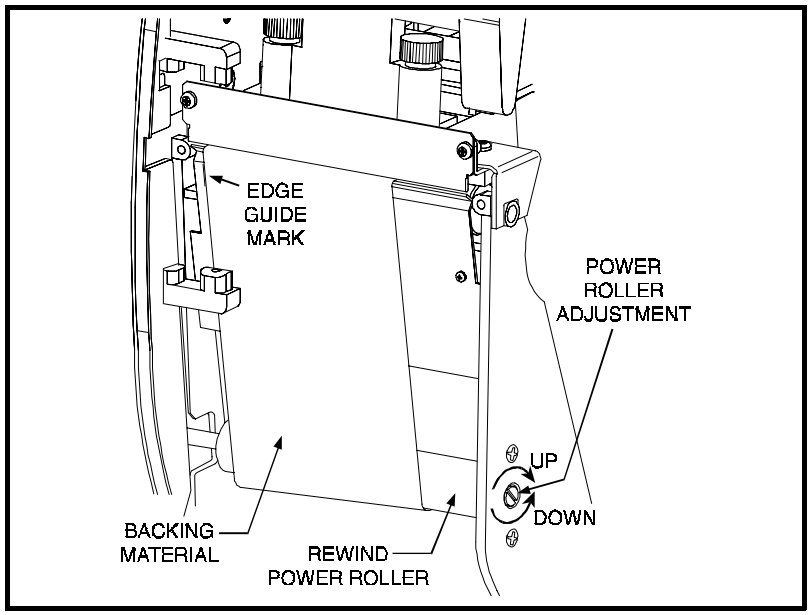

Figure 26 Backing Rewind Power Roller

When the Power Roller is properly adjusted, the backing material should have even tension across its entire width and be wrapped snugly around all Guides and Rollers. If the tension is not even, the media/backing material may slide (walk) to the left or to the right as printing occurs. This can cause print registration problems on the labels.

Figure 26 illustrates an improperly adjusted Backing Rewind Power Roller. On the left side, the backing material is not contacting the Power Roller. The backing has more tension on the right edge than on the left edge.

Use a coin or screwdriver to turn the Power Roller Adjustment.

The Adjustment Mechanism changes the position of the right end of the Roller, while the left end is stationary. The right end moves up and down for tension balance.

Turning this Adjustment in a counterclockwise direction causes the right end of the Power Roller to move DOWN and increases the tension on the right side of the backing material. (Turning the Adjustment in a clockwise direction moves the right end of the Power Roller UP and decreases the tension on the right side.)

Balancing the tension increases the reliability of the printer to provide properly printed labels by preventing the label backing from walking.

Use the FEED Key Self Test (see Chapter 4) or your own label format to print several labels to insure tracking is maintained and tension on both edges of the backing material remains consistent. Remember to remove each label as it is automatically peeled away from the backing.

Battery Replacement

Your printer may be equipped with Battery Backed-Up Memory. The battery used with this feature is a 3 VDC lithium battery.

It is recommended that a qualified service technician replace this battery since internal access to the electronics area of the printer is required. Further information regarding the replacement of this battery is contained in Volume 1 of the Maintenance Manual (part # 44868L for Volume 1 only, order part # 44452L for both Volumes 1 and 2).

Warning: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instruction.

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4 Troubleshooting and Diagnostics

If the Zebra Stripe Printer operates in an abnormal fashion, consult the Troubleshooting Table below. The Printer Diagnostics following the Troubleshooting Table may also help you to determine the problem.

The troubleshooting of some problems may be beyond the abilities of the operator. In these cases, call a service technician to perform additional troubleshooting and repair procedures.

> **Note:** *A two-volume maintenance manual is available from Zebra Technologies Corporation for use by the service technician.* Volume 1: General Maintenance *(part # 44868L),* Volume 2: Circuit Descriptions and Electrical Schematics *(part # 44869L), or you may order both volumes under part # 44452L.*

Troubleshooting Table

Troubleshooting Table		
Symptom	**Diagnosis**	**Action**
No lights ever turn ON.	No AC Power applied to the Printer.	Insure the AC Power Cable is connected to a working voltage source.
	Faulty AC Power Fuse.	Refer to Chapter 3 for fuse replacement procedures.
	No voltage available from the internal Power Supply.	Call a service technician.
Printer locks up when running Power On Self Test.	An improper configuration was set.	Reload factory defaults. Then, set correct parameters. See Chapter 1.
POWER light ON, other lights all OFF or all ON and the printer locks up.	ROM CRC Test has failed.	Call a service technician.
Calibrate light is OFF but all other lights are ON.	Dynamic RAM failed.	Call a service technician.
Calibrate light and Position light OFF but all other lights ON.	FONT ROM Error.	Call a service technician.
Printer stops, PAUSE light and PAPER/RIBBON light both ON.	Media incorrectly or not loaded.	Load media correctly. See Chapter 1.
	Misadjusted Media Sensor.	Check Position and Sensitivity of Media Sensor. See Chapter 1.

Troubleshooting Table		
Symptom	**Diagnosis**	**Action**
Printer stops, PAUSE light ON and PAPER/ RIBBON light FLASHING.	Ribbon incorrectly or not loaded.	Load ribbon correctly. See Chapter 1.
	Malfunctioning Ribbon Sensor.	Call a service technician.
Printer stops, PAUSE light ON and PRINTHEAD light FLASHING.	Printhead is not fully closed.	Close printhead completely.
	Printhead Open Sensor not detecting its position flag.	Call a service technician.
Printer stops. PAUSE light and PRINTHEAD light both ON.	Printhead element is overheated.	Printer resumes printing when the printhead element cools.
Dots missing in printed area of label.	Printhead element going bad. Print quality problems.	Call a service technician.
Loss of printing registration on labels.	Possible Media Sensor problem.	Adjust Media Sensor Position and call a service technician if necessary.
	Printer set for non-continuous media, but continuous media loaded.	Set printer for correct media. See Chapter 3.
For Peel-Off Mode:	Improperly adjusted Media Edge Guides or Power Roller.	Refer to Chapters 1 and/or 3 for proper positioning and adjustments.
Excessive Vertical Drift in Top-of-Form registration.	Incorrect media Loading or media Sensor Adjustments.	See Media Loading or Media Sensor Adjustment in Chapter 1.
Light vertical lines approximately .006 wide running through all labels.	Dirty head or ribbon rollers.	See Printhead Cleaning in Chapter 3.
	Defective Printhead Elements.	Call a service technician
Light printing or no printing on the left or right side of the label.	Printhead needs balancing.	Adjust balance. See Toggle Pressure Adjustment in Chapter 3.
Short printed lines at 45° to label edge on left or right side of label.	Too much Printhead pressure.	Reduce the pressure. See Toggle Pressure Adjustment in Chapter 3.
Fine gray lines on blank labels at angles.	Wrinkled ribbon.	See Wrinkled Ribbon in this Table.
Long tracks of missing print on several labels.	Wrinkled ribbon.	See Wrinkled Ribbon in this Table.
	Print Element damaged.	Call a service technician.

Troubleshooting Table		
Symptom	**Diagnosis**	**Action**
Truncated print, no print, or FEED Key operates incorrectly while using non-continuous media.	Media or ribbon improperly loaded.	See Media and Ribbon Loading Instructions in Chapter 1.
	Incorrect Media Sensor Position or Sensitivity.	See Media Sensor Position Adjustment in Chapter 1.
In Peel-Off Mode, skewed or stuck labels.	Glue material from Back of Labels causing media movement problems.	Refer to Chapter 3 and perform maintenance and cleaning of the printer.
	Media and Backing not properly aligned in printer.	Refer to Chapters 1 and 3 and reload media and adjust the Power Roller if needed.
In Cutter Mode, skewed, stuck, or improperly cut labels.	Cutter is dirty.	Follow Cutter Cleaning Procedure in Chapter 3.
Wrinkled ribbon.	Ribbon fed through machine incorrectly.	See Ribbon Loading in Chapter 1.
	Incorrect Darkness setting.	Set to the lowest value needed for good print quality.
	Incorrect printhead position or pressure.	See Print Quality Adjustments and Toggle Pressure Adjustment in Chapter 3.
	Incorrect Dual-Tension Spindle setting.	Pull Spindle End-Cap out when using wide media to obtain normal (higher) tension. See Adjusting the Ribbon Supply Spindle in Chapter 1.
	Media not feeding properly; it is walking from side to side.	Make sure the media is snug by adjusting the media guides.
	Continuing Symptoms.	Call a service technician.
Misregistration and misprint of 1 to 3 labels.	Media was pulled when motor was not moving.	Open and close the printhead, so it calibrates to find the label length.
	Incorrect Media Sensor Position.	See Media Sensor Position Adjustment in Chapter 1.
	Media or ribbon improperly loaded.	See Media and Ribbon Loading procedures in Chapter 1.
Changes in parameter settings did not take effect.	Parameters are set or saved incorrectly.	See Chapter 1. Reload the Factory Defaults, calibrate the printer, then cycle the Power ON/OFF Switch.
	If problem continues, there may be a problem on the Main Logic Board.	Call a service technician.

Troubleshooting Table		
Symptom	**Diagnosis**	**Action**
When using wide ribbon (over 2.4"), the image gets lighter or smears near the end of the roll of ribbon. Ribbon appears to slow down or stop.	Too much back-tension on the ribbon.	See Chapter 1. Adjust the Ribbon Supply Spindle to provide low tension.
ZPL was sent to printer, but not recognized. The DATA light remains OFF	Communications parameters or DIP Switches are set incorrectly.	Perform the MODE Key Self Test. Check for format or overrun errors. Reset communication parameters if needed.
	Prefix and delimiter characters set in printer configuration do not match the ones sent in the ZPL Label Formats.	Set the characters in the printer to match ZPL format. Check Configuration Printout for correct characters. If problem continues, check the ZPL format for changed ^CC, ^CT, and ^CD instructions.
Labels are not being cut at all.	Cutter Option not available.	The Cutter Option is installed at the factory. Non-Cutter units are not retrofittable. Call Zebra for information about purchasing a new printer equipped with this option.
	Cutter Option not installed/enabled.	See Chapter 3.
The Cutter is not cutting labels cleanly.	Cutter is dirty.	Follow cutter cleaning procedure on page 27.
	Cutter Blades are dull.	Replace Cutter Module.
The Cutter is jamming up with labels or labels are being cut more than once.	Cutter is dirty.	Follow cutter cleaning procedure on page 27.
	Label length is too short.	Increase label length.

Troubleshooting Table			
Symptom		**Diagnosis**	**Action**
Printing stops. PAPER/RIBBON, PAUSE, and CANCEL lights on		Out of media.	Load media. See Chapter 1.
	For printers with the Cutter Option installed.	Media jammed in Cutter.	Remove media, clean Cutter Module if necessary. See page 27.
		Connecting cable not connected to Cutter Module.	Plug Cable into Cutter Module. See page 27.
		Cutter Module is dirty.	Clean Cutter Module. See page 27.
		End of the media not positioned correctly on top of Platen.	Reposition media so that the end is on top of the Platen. See Chapter 1.
		If error condition persists after attempting each of the above solutions, call a service technician.	

Printer Diagnostics

Power-On Self Test

A Power-On Self Test (POST) is performed automatically each time the printer is turned ON. This test checks for proper initialization of various electronic circuits and establishes starting parameters as those stored in the printer's memory. During this test sequence, the front panel lights will turn ON and OFF to insure proper operation.

At the end of this self test, only the POWER light will remain lit. If other lights are also lit, refer to the Troubleshooting Table.

Additional Printer Self Tests

These self tests produce sample labels and provide specific information which helps the operator determine the operating conditions for the printer.

Each self test is enabled by holding in a specific front panel key while turning the Power Switch ON. Keep the key depressed until the Front Panel lights turn ON. When the Power-On Self Test is complete, the selected printer self test will automatically start.

NOTES:

- When performing self tests, disconnect the Signal Interface Cable from the printer.
- When canceling a self test before its actual completion, always turn the printer Power Switch OFF and back ON.
- When performing these self tests while in the Peel-Off Mode, the operator must remove the labels as they become available.
- When the Cutter Option is installed and enabled, the labels printed in these self tests should be automatically cut as they are printed.

CANCEL Key Self Test

This self test prints the printer's configuration parameters that are currently stored in Configuration (EEPROM) Memory. See Figure 27.

The configuration may be changed either temporarily (for specific label formats or ribbon and label stock), or permanently (by saving the new parameters in memory.) Saving new parameters occurs whenever a Printer Configuration procedure is performed. See Chapter 1 for more information.

PAUSE Key Self Test

This self test can be used to provide the test labels required when making adjustments to the Printer's Mechanical Assemblies. These test labels can also be used during the Configuration Mode Adjustments described in Chapter 1. See Figure 28.

This self test consists of four individual test features.

The initial self test prints 15 labels at speed "A" then automatically pauses the printer. Each time the PAUSE key is pressed, an additional 15 labels will print, up to a maximum of 9999 labels.

While the printer is paused, pressing the CANCEL key once alters the self test. Now each time the PAUSE key is pressed, the printer prints 15 labels at speed "D" up to a maximum of 9999 labels.

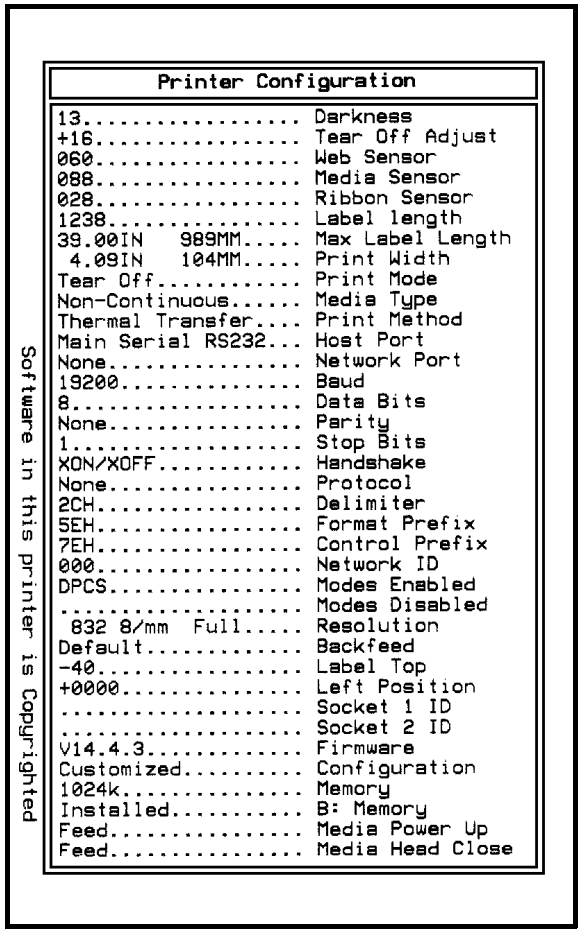

Figure 27 CANCEL Key Self Test Printout

While the printer is paused, pressing the CANCEL key a second time alters the self test again. Now each time the PAUSE key is pressed, the printer prints 50 labels at speed "A" up to a maximum of 9999 labels.

While the printer is paused, pressing the CANCEL key alters the self test a third time. Now each time the PAUSE key is pressed, the printer prints 50 labels at speed "D" up to a maximum of 9999 labels.

FEED Key Self Test

The results of this self test will be used to determine the best Darkness Setting for a specific media/ribbon combination.

See Figure 29. The FEED Key Self Test labels will print at various plus or minus Darkness settings relative to the current darkness setting. The operator inspects these printouts and determines which printout has the best darkness setting.

The value on that printout is added to (plus) or subtracted from (minus) the current Darkness value.

To make the change, you need to adjust the Print Darkness (as described in Chapter 1).

1. Press the MODE Key.
2. If the value on your FEED Key Self Test Printout is a plus value, press UP the appropriate number of times. Otherwise, press DOWN to enter a minus value.
3. Press the MODE Key three (3) times.
4. Press PAUSE.

Alternatively, increments to the actual Darkness value can be programmed into the label formats sent to the printer. To see the actual value of the current darkness setting, perform a CANCEL Key Self Test: the value will print on the Configuration Printout.

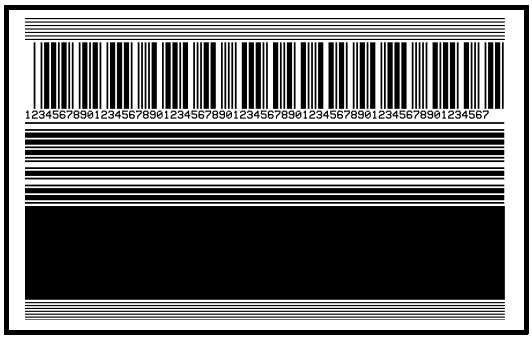

Figure 28 PAUSE Key Self Test Printout

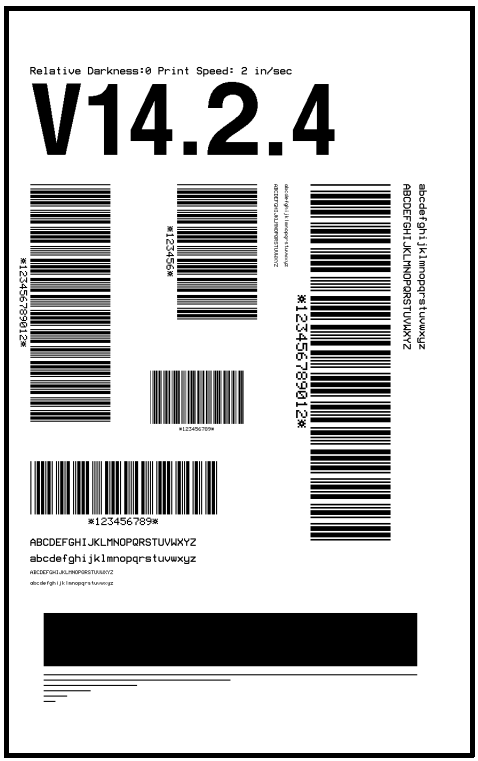

Figure 29 FEED Key Self Test Printout

MODE Key Self Test

This self test places the printer in a Communications Diagnostics Mode. In this mode, the printer prints the ASCII characters and their corresponding hexadecimal values for any data received from the host computer. See Figure 30.

Note: *Turn the power OFF to exit this self test.*

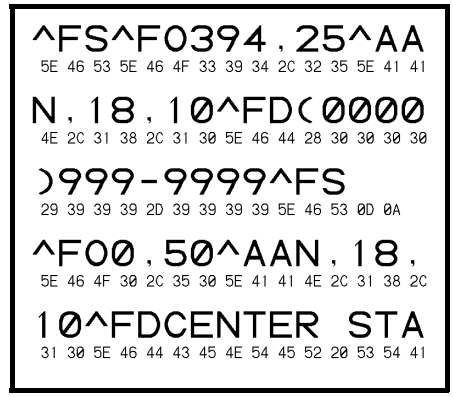

Figure 30 MODE Key Self Test Printout

FEED Key and PAUSE Key

If it is ever necessary to reset the printer configuration to the factory default values, press these two keys at the same time while turning the Power ON. Permanently save these values in memory by pressing the MODE key four (4) times - MODE lights cycle ON then OFF. **A Media Calibration procedure must be performed any time Factory Default values are saved.** See Chapter 1.

Extended Printer Diagnostics

Extended diagnostic tests are available for the Zebra Stripe Printer. The Stripe Maintenance Manual, Volume 1 (part # 44868L), provides information needed to perform these additional tests.

5 Specifications

Note: Your printer may not have all of the options described in these specifications.

General Specifications

Height		13"	330mm
Width		8.25"	209.6mm
Depth		17"	431.8mm
Weight (option-dependent)		17.25 lbs	72.21 kg
Electrical		110 or 220 VAC + 10%/–15%, 48-62 Hz	
		5 Amps @ 110V, 3 Amps @ 220V	
		Built to CISPR 22B, UL 1950, CSA 950, IEC 950, 801-2,-3, and -4 standards; Complies with FCC class "A" and Canadian Doc. class "A" rules; Carries the CE mark of compliance	
Temperature	Operating	40 to 105° F	5 to 40° C
	Storage	-40 to 140° F	-20 to 60° C
Relative humidity		5 to 85%, non-condensing	
Communications interface		RS-232 Serial Data Interface; 110 - 19,200 Baud; Parity, Bits/Char. and XON-XOFF or DTR Handshake Protocols - all switch selectable	
		8-Bit Parallel Data Interface (S-500 only)	
		Error Detection CRC Protocol	

Printing Specifications

Printing Specifications			Stripe S-300 Printer	Stripe S-500 Printer	Stripe S-500 Printer with Optional 6 Dots per mm Printhead
Resolution			203.2 dots per inch (8 dots per mm)		152.4 dots per inch (6 dots per mm)
Dot size (square)			0.00492" (0.125 mm)		0.00656" (0.167 mm)
Maximum print width			4.09" (104 mm)		
Print length	Minimum		0.00492" (0.125 mm)		
	Maximum	Standard memory	6" (152 mm)	15" (381 mm)	26" (660 mm)
		With additional memory	18" (457 mm) (256 KB expansion)	39" (991 mm) (512 KB expansion)	39" (991 mm) (512 KB expansion)
Bar code modulus ("X") dimension			5 mil to 55 mil		6.6 mil to 72 mil
Programmable constant printing speeds			2" (50.8 mm)	2" (50.8 mm)	
				3" (76.2 mm)	
				4" (101.6 mm)	
				5" (127.0 mm)	
				6" (152.4 mm)	
Thin film printhead with Energy Control					

Media Specifications

Total media width	Maximum		4.5"	115 mm
	Maximum with cutter installed		4.0"	101.6 mm
	Minimum		0.75"	19 mm
Label length	Maximum		See "Printing Considerations" (page 45)	
	Minimum	Tear-Off	0.63"	16 mm
		Peel-Off	1.00"	25.4 mm
		Cutter	1.50"	38.1 mm
Total thickness (includes liner)	Maximum *(Printhead position may need to be adjusted above 0.01")*		0.012"	0.304 mm
	Minimum		0.003"	0.076 mm
Core size			3.0"	76.2 mm
Maximum roll diameter			8.0"	203.2 mm
Inter-label gap	Maximum		0.157"	4 mm
	Minimum		0.079" (0.118" preferred)	2 mm (3 mm preferred)
Ticket/tag notch size			0.236" W x 0.079" L	6 mm W x 2 mm L

Ribbon Specifications

Ribbon Width *Zebra recommends using ribbon at least as wide as the media to protect the printhead from wear.*		Minimum	1.57"	40 mm
		Maximum	4.3"	110 mm
Standard Lengths	2:1 media to ribbon roll ratio		984'	300 m
	3:1 media to ribbon roll ratio		1476'	450 m
Ribbon core inside diameter			1.0"	25.6 mm
Maximum ribbon roll diameter			3.20"	81.3 mm

Media Handling

- Tear-off mode: Produced in strips
- Peel-off mode (S-500 only): Dispensed and peeled from the liner
- Cutter mode (S-500 only): Printed and individually cut
- Rewind mode: Labels externally rewound (Requires optional rewinder, not available from Zebra Technologies Corporation)

Operator Controls

- AC Power ON/OFF Switch
- PAUSE key - stops and restarts the printing process
- FEED key - forces the printer to feed one blank label
- CANCEL key - cancels the printing of label formats sent to the printer
- MODE key - places the printer in the Configuration Mode

Options (* Factory-Installed)

- 512 KB RAM Expansion (for a total of 1 MB RAM) (S-500 only)
- 256 KB RAM Expansion (for a total of 512 KB RAM) (S-300 only)
- * 256 KB Battery Backed-Up RAM for label formats and graphics (S-500 only)
- * Peel-Off Mode with Backing-Only Rewind feature (S-500 only)
- * Cutter with Label Catch Tray (S-500 only)
- Scalable and Bitmap Smooth Fonts available for text (S-500 only)
- Parallel interface (S-500 only)

Zebra Programming Language (ZPL II®)

- Downloadable graphics (with data compression)
- Bit image data transfer and printing, mixed text/graphics
- Format inversion
- Mirror image printing
- Four-position field rotation (0°, 90°, 180°, 270°)
- Slew command
- Programmable quantity with print pause
- Communicates in printable ASCII characters
- Controlled via mainframe, mini, PC, Portable Data Terminal
- Serialized fields
- In-Spec OCR-A and OCR-B
- UPC/EAN [nominal 100% magnification (6 dots/mm printheads only)]

Bar Codes

- Code 11
- Code 39 (Supports ratios of 2:1 to 3:1)
- Code 49 (2-Dimensional Bar Code) (S-500 Only)
- Code 93
- Code 128 - Supports serialization in all subsets and UCC Case Codes
- Codabar (Supports Ratios of 2:1 to 3:1)
- Interleaved 2 of 5 (supports Ratios of 2:1 to 3:1, Modulus 10 Check Digit)
- Industrial 2 of 5, Standard 2 of 5
- LOGMARS
- Plessey
- EAN-8, EAN-13, EAN EXTENSIONS
- UPC-A, UPC-E, UPC EXTENSIONS
- MSI
- PDF-417 (2-Dimensional Bar Code) (S-500 Only)
- POSTNET
- MaxiCode
- Check digit calculation where applicable

Standard Printer Fonts

For more information on fonts, refer to your ZPL II Programming Guide.

8 Dots/mm Printhead				
Fonts	**Dot Matrix (h x w)** (Defaults)	**Type***	**Minimum Character Size (h x w)**	**Max Char /In**
A	9 x 5	U-L-D	.044″ x .030″	33.3
B	11 x 7	U	.054″ x .044″	22.7
C, D	18 x 10	U-L-D	.089″ x .059″	16.9
E	28 x 15	OCR-B	.138″ x .098″	10.2
F	26 x 13	U-L-D	.128″ x .079″	12.7
G	60 x 40	U-L-D	.295″ x .236″	4.2
H	21 x 13	OCR-A	.103″ x .093″	10.8
GS	24 x 24	SYMBOL	.118" x .118"	8.5
Ø	15 x 12	SCALABLE (SMOOTH) FONT		

6 Dots/mm Printhead				
Font	**Dot Matrix (h x w)** (Defaults)	**Type***	**Minimum Character Size (h x w)**	**Max Char /In**
A	9 x 5	U-L-D	.059″ x .039″	25.4
B	11 x 7	U	.072″ x .059″	16.9
C, D	18 x 10	U-L-D	.118″ x .079″	12.7
E	21 x 10	OCR-B	.138″ x .085″	11.7
F	26 x 13	U-L-D	.170″ x .105″	9.53
G	60 x 40	U-L-D	.394″ x .315″	3.18
H	17 x 11	OCR-A	.111″ x .098″	10.2
GS	24 x 24	SYMBOL	.157″ x .157″	6.35
Ø	15 x 12	SCALABLE (SMOOTH) FONT		

* Type: U - Upper Case, L - Lower Case, D - Descenders

- Bit-mapped fonts A, B, D, E, F, G, H, and GS are expandable up to 10 times, height- and width-independent. However, fonts E and H (OCR-B and OCR-A) are not considered in-spec when expanded.
- The Scalable Smooth Font (CG Triumvirate™ Bold Condensed) is expandable on a dot-by-dot basis, height- and width-independent, while maintaining smooth edges, to a maximum of 1500 x 1500 dots.
- IBM Code Page 850 International characters available in fonts A, B, D, E, F, G and Ø through software control.

Standard Printer Font Examples

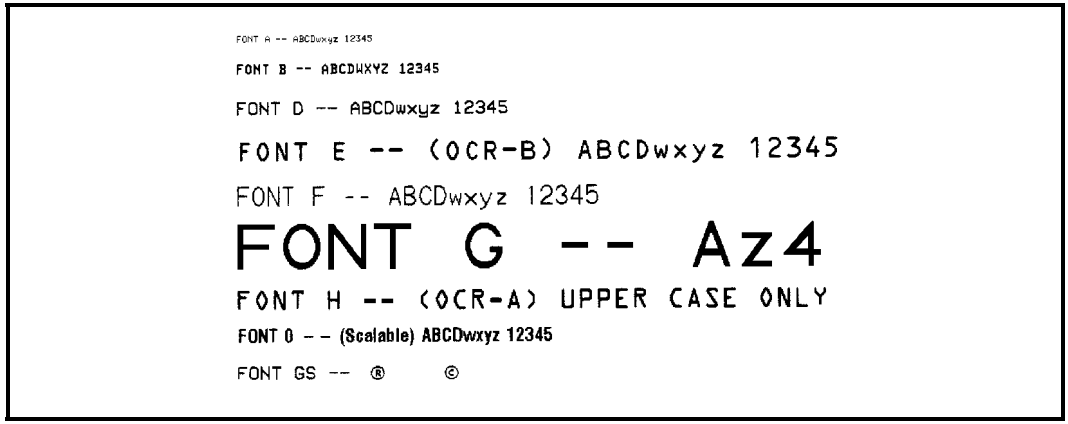

Figure 31 Default Printer Fonts (8 Dots/mm)

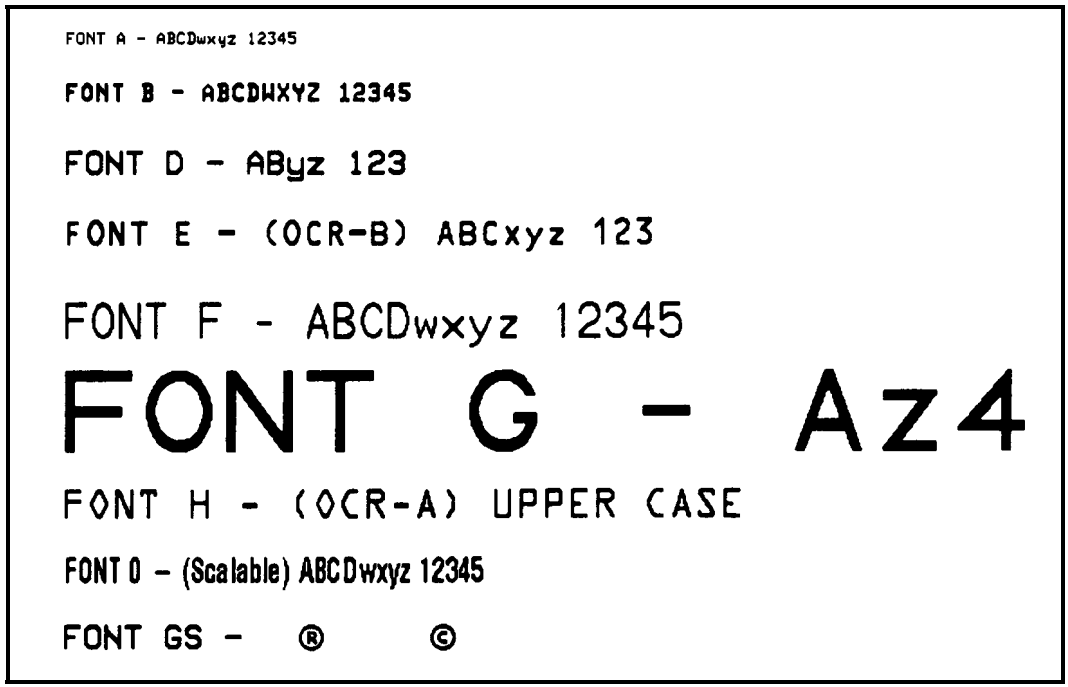

Figure 32 Default Printer Fonts (6 Dots/mm)

Optional Printer Fonts

There are many optional character fonts that can be purchased for your Stripe in addition to those which are standard in the unit. From time to time, additions may be made to the list of available fonts. Contact Zebra Technologies Corporation or your sales representative for further information.

Only one additional font can be installed in the printer at a time. This installation should be performed by a service technician. Once installed, this font can be used in addition to the standard fonts available in the printer. Refer to your ZPL Programming Guide or, if using another software package to drive your printer, to the instructions accompanying that package.

Once an optional font is installed in the printer, the Configuration Printout produced during the CANCEL Key Self Test will indicate the font type as the "Socket 2 ID".

Optional Printer Fonts Currently Available	
Scalable Smooth Fonts (each is supplied as a complete set of Normal, Bold, Italic, and Bold Italic styles)	Bitmap Smooth Fonts (supplied only in Bold). Type sizes: 6 pt, 8 pt, 10 pt, 12 pt, 12 pt, 14 pt, 18 pt, 24 pt.
CG Triumvirate™	CG Triumvirate™
—	CG Triumvirate™ Condensed*
CG Times™	CG Times™
CG Palacio™	CG Palacio™
Futura™	Futura™
Univers®	Univers®

*When equipped with the Bitmap CG Triumvirate™ Bold Condensed Font, the S-500 has the same font styles as the S-300 printer.

Figures 33 and 34 illustrate the optional fonts, and Figure 35 shows sample point sizes for the bitmap smooth fonts.

Optional Printer Font Examples

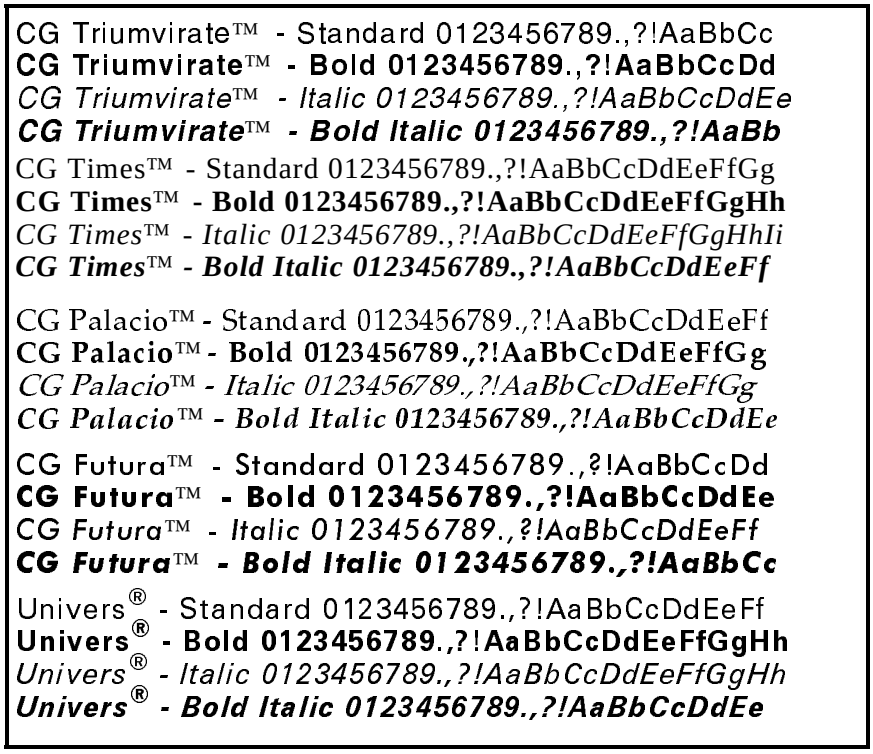

Figure 33 Scalable Smooth Fonts (Optional)

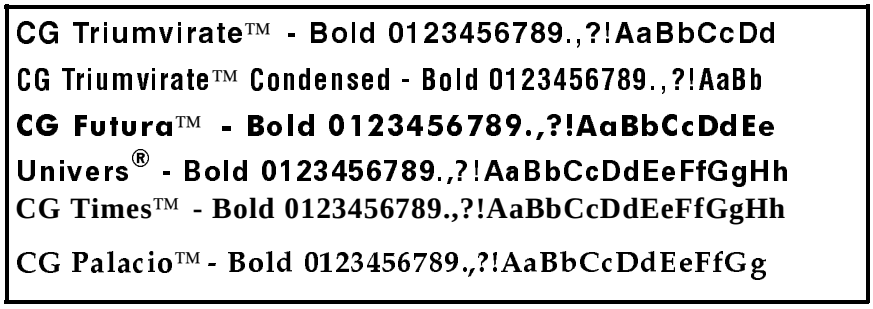

Figure 34 Bitmap Smooth Fonts (Optional)

Figure 35 Bitmap Smooth Fonts: Point Size Examples

6 Support Services

How to Reach Us

Which number do you need?	Zebra Technologies Corporation, USA	Zebra Technologies Europe Limited, UK
Inquiry Department: For literature and distributor information.	(847) 634-6700	+44 (0) 1494 472872
Customer Service: Printers, parts, media, and ribbon: call your distributor or call Zebra Technologies Corporation.	(847) 634-6700	+44 (0) 1494 474222
Technical Support: For questions relating to the mechanical operation of Zebra equipment you already own: call your distributor or contact Zebra Technical Support.	Phone: (847) 913-2259	+44 (0) 1494 472872
	Fax: (847) 913-2578	+44 (0) 1494 536644
	BBS: (847) 821-7113	BBS: (847) 821-7113
Zebra's Corporate Offices	(847) 634-6700	+44 (0) 1494 472872

Technical Support

Sometime during the life of your Zebra Technologies Corporation equipment you may find yourself in need of technical assistance. We provide a fully-trained technical support staff to answer any questions you may have.

Zebra Technical Support Bulletin Board Service

(847) 821-7113

available 24 hours a day, 7 days a week

Zebra's trouble-free, immediate-access technical support bulletin board system allows you to identify and resolve the most common technical support issues immediately while on-line. It also provides information related to Zebra products and repair services. This is a multi-user BBS with ANSI or RIPscript support. In order to view RIPscript graphics, download the free graphical user interface, which provides point and click capabilities. The automated attendant is available 24 hours a day, 7 days a week.

With your PC or terminal connected to a modem, simply dial (847) 821-7113 and answer the sign-on questions. Set your system to 8 data bits, no parity, and 1 stop bit. We automatically accommodate modem speeds up to 28,800 baud.

We recommend that you set a screen log in your communication package so that you can record the information accessed on your PC for offline review. We support virtually all standard communications packages.

Support Services

Technical Support Service via Telephone

Before you call - Misunderstanding instructions or omitting a step are the most common sources of error. Please reread the manual and use the table of contents and appendixes for help.

Be prepared - To possibly avoid excess time and expense of a long-distance phone call, please complete the Service Form on the next page in its entirety. Only with ALL of the information requested can we give you accurate and fast assistance. Also, you should be able to answer the following questions when you call:

- Does the printer perform all self test functions properly?
- Does the printer work properly with some equipment but not with others?
- Are the cables the same? Were the configuration settings changed?
- Is the problem limited to one label, or does it occur on all labels?

Zebra Technical Support is available Monday - Friday. Call us directly at:

Zebra USA	(847) 913-2259	7:15 a.m. to 5:30 p.m. CST
Zebra UK	+44 (0) 1494 472872	9:00 a.m. to 5:30 p.m. GMT

Technical Support via Mail or Fax

If you prefer to seek assistance in writing, please mail or fax a completed Service Form (on the next page) to the address or fax number shown on the form. Enclose any sample printouts that might illustrate the problem. This is necessary to avoid delays.

Zebra Technologies Corporation
Service Form

Zebra Technologies Corporation
333 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3109

Phone Number: (847) 913-2259
Telefax Number:(847) 913-2578

Zebra Technologies Europe Limited
Zebra House, The Valley Centre
Gordon Road, High Wycombe
Buckinghamshire HP13 6EQ England

Phone Number: +44 (0) 1494 472872
Telefax Number: +44 (0) 1494 450103

Complete this form before requesting technical assistance.

Serial # _____

Model # _____
(Be specific: include ALL letters and numbers)

Company _____

Address _____

City _____

State, Zip _____

Phone # (_____) _____

Contact _____

Hours available for return call _____
Hardware interface type _____
Unit interfaced with _____

Description of problem, including actions taken just prior to problem occurring:

_____
_____
_____
_____

Product Service and Support Programs

At Zebra Technologies, our service and support goal is to keep your printer performing optimally. Zebra Technical and Repair Services provide a broad range of service options and are your expert sources for your support and maintenance needs. If you are in need of technical assistance or repair services, our technical support staff stands ready with answers to any questions you may have. No matter how simple or complex your situation, ***Zebra's Hotline Support*** is always just a phone call away. **Call (847) 913-2259.**

Select The Program That Fits Your Business

If your Zebra equipment requires maintenance, you can select the service option that best fits your needs. Zebra offers several choices for those of you located both within and outside of the United States. Service options available within the United States include:

- **Extended Factory Service Agreement**: Customer Shipping Option
- **Third Party Support and Maintenance**: Zebra Solution Center Support, National Sales and Service Center Support, Zebra authorized National On-Site Service by Wang Customer Services Division
- **Zebra Factory Services:** Flat Rate Factory Service
- **User Self Maintenance:** Operator and Maintenance Training Programs

No matter which program you choose, you'll find the Zebra response consistently fast and reliable.

Buying a Maintenance Agreement places a blanket of protection around your Zebra equipment. It provides the peace of mind knowing that your units are insured against unexpected and potentially costly repairs. You have the assurance that service will be available when you need it, minimizing your downtime.

Extended Factory Service Agreement

The **Extended Factory Service Agreement** covers all parts and labor required to assure optimum performance (with the exception of printheads). All Zebra equipment returned for service under this agreement is subjected to a complete preventive maintenance procedure at no additional charge.

Return shipping charges, via UPS Ground from Zebra, are also covered. Five working days are normally required for repair and return processing. Optional Expedited Service is also available for a nominal fee.

Customer Shipping Option - If you can realize cost savings by utilizing your own carriers for round trip shipment of your Zebra equipment, Zebra offers the **Customer Shipping Option**, giving you complete control over the method and price of transporting your equipment.

Third Party Support And Maintenance

Zebra Solution Center and National Sales and Service Center Support

Our ZSC and NSSC business partners offer Zebra approved third party maintenance programs. Both On-Site and Depot Repair programs may be available, depending upon the organization. Contact our Technical Services staff for more information on the ZSC for your region.

Wang Customer Services Division

Zebra Technologies' Authorized National Service Supplier provides On-Site Maintenance of the complete line of Zebra printers. Wang and Zebra work together to provide the TotalCare™ Service Program for our customers. TotalCare™ is a comprehensive package of support services designed specifically for the Zebra line of printer products.

Your business requires the Zebra printer to be ready when you are. To help you, Wang offers a complete maintenance program at your location. You have a variety of remedial support services from which to choose. Each includes toll-free access to Wang's National Response Center, Installation/Relocation Services and Preventive Maintenance Procedures.

Those of you who do not contract for Wang TotalCare™ Service can still obtain service from Wang. On-site maintenance is available from Wang to non-contracted customers on an "as available" basis. Labor is billed at the normal hourly Wang labor rates, and any parts that may need replacement are billed at list price. Contact a member of our Technical Services staff for more information on Wang service options.

Zebra Factory Services

The potential savings and peace of mind provided by prepaid service agreements may not fit your business needs. If you require a pay-as-you-go service program, Zebra's **Flat Rate Factory Service** is the smart option for getting quality repair work if the need arises.

It's simply a matter of contacting a member of our Technical Services staff with your service request. We quote repair prices and issue a Return Material Authorization (RMA). You ship us your equipment and we perform the repairs quickly. Your equipment is returned to you according to your instructions.

Charges are based on the Flat Rate Unit Repairs and Flat Rate Module Repairs schedules.

Return shipping charges via the carrier of your choice (UPS Ground within the United States, if not specified) will be added to your final invoice. Five working days are normally required for repair and return processing.

Optional expedited service is available, for a nominal additional fee, that assures that your repaired and tested module or unit is shipped back to you within 48 hours of receipt (excluding weekends and holidays).

User Self Maintenance

If qualified technicians are part of your organization, then this may be the option that best fits your needs. Zebra Technical Services provides a variety of helpful services if you choose to perform your own maintenance.

Making sure you have the proper spare parts is just one of the ways we can help. Product-specific parts and maintenance documentation is available and repair parts can be expedited at your request.

Training seminars are offered regularly to assist your technicians with equipment repairs. Two of the most important aspects of successful product repair are experience

and training. Take advantage of our years of experience and give your technicians the advantage of comprehensive factory training.

Training is conducted at Zebra's Corporate facility located a short drive away from Chicago's O'Hare International airport. A full range of subjects are offered from basic indoctrination through maintenance and adjustments to advanced programming techniques. On-site training and custom classes are available. Class content can be customized and schedules developed upon request to address the specific needs of your organization. Costs are dependent upon class length and material covered.

International Service and Support

In addition to our factory service and support programs, your support and maintenance needs are provided through a network of third party service suppliers, authorized Zebra distributors and resellers in over 50 countries throughout the world. These organizations offer a variety of service and support programs allowing you to select the service option that best meets your needs. For more information on the service suppliers in your country, contact our Technical Support Staff at Zebra's International Headquarters in the United States. Or, if you are located in Europe, contact our European Headquarters in the United Kingdom.

Don't let a maintenance problem interrupt your label production!

For more information about Zebra Technologies' Service and Support Programs, contact our Technical Support staff at:

Zebra Technologies Corporation
333 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3109

Phone Number: (847) 913-2259
Telefax Number:(847) 913-2578

Zebra Technologies Europe Limited
Zebra House, The Valley Centre
Gordon Road, High Wycombe
Buckinghamshire HP13 6EQ England

Phone Number: +44 (0) 1494 472872
Telefax Number: +44 (0) 1494 450103

Zebra Training Programs

At Zebra Technologies, our training goal is to provide quality training programs that enhance the value of your Zebra® printers. We realize two of the most important aspects of successful printer operation and maintenance are experience and training. Now you can take advantage of our years of experience in operations, applications, maintenance and technical support and give yourself the advantage of comprehensive factory training.

All Zebra courses have been developed and enhanced to meet the specific needs of those who require in-depth knowledge of Zebra printing systems. Depending on your training requirements, you have the flexibility of being able to choose from individual training courses or packaged course groupings.

Training is conducted at Zebra's manufacturing and sales facility located a short drive away from Chicago's O'Hare International Airport in Vernon Hills, Illinois. The curriculum includes a full range of subjects including introductory courses covering bar codes, thermal printing technology and selection of media and ribbons; printer maintenance and operation courses; and advanced programming and label designing courses.

Each course is designed around a hands-on philosophy of instruction. Students receive professionally prepared training workbooks and maintenance manuals. On-site training and custom courses are available. Class content can be customized and schedules developed upon request to address the specific needs of your organization. For customized or on-site courses, tuition costs are dependent upon course length and subjects to be covered.

In addition to operations and maintenance courses, Zebra offers our customers the option of attending two unique course formats. Bar Codes at Work is designed to improve the thermal printing and bar code knowledge base of many of our users and technicians. Labeling provides the technician, end-user, and programmer with the tools and techniques necessary to effectively produce labeling solutions.

Operations and Maintenance Courses

Each Operations and Maintenance Course first introduces the student to various bar code concepts and terminology. Topics include direct thermal/thermal transfer printing, continuous and non-continuous media, thin film thermal printheads, and serial and parallel communication interfaces. After completing this introductory material, the student focuses on printer setup and configuration. Each student sets up a printer, exercises its' self-test diagnostics, and performs the preventive maintenance procedures required to insure trouble free operation. Mechanical and electrical operations are detailed through the disassembly and reassembly of the printer. Printer options including Cutter, Rewind, Twinax and Coax Interfaces, and memory expansion are installed and adjusted. Critical checks and alignments important to the proper operation of the printer such as media and ribbon sensor sensitivity, spindle maintenance and adjustments, printhead replacement and print quality alignments are discussed and performed by our students. Troubleshooting techniques and common faults are described and reviewed through hands-on exercises. To assist in troubleshooting communications related problems an introduction to the Zebra Programming Language (ZPL® and ZPL II®) is provided. Students review the general structure of ZPL and then interface computers to the Zebra printers and follow a series of exercises which lead them through the steps necessary create and print labels.

Zebra printer courses may be taken separately or bundled together to cover printer families. The following table displays the course offerings currently available.

Course Name	Printers Covered
105S/160S/Stripe	105S, 160S, S500, S300
105S/160S	105S, 160S
Xi Series	90Xi, 140Xi, 170Xi
Xi/Z14X/Z91	90Xi, 140Xi, Z140, Z142, Z143, Z91
Z14X/Z9XA/Z91	Z140, Z142,Z143, Z91, Z90A, Z92A, Z93A
Z130	Z130
Z22X	Z220, Z221, Z222, Z223
Z9X/105	Z90, Z92, Z93, Z95, Z105

Bar Codes at Work

This one day course presents an introduction to Bar Coding. This course will discuss bar code terminology, specifications, and applications associated with selected, often-used bar codes. In order to gain a better understanding of labeling problems and solutions, the selection and matching of media and ribbons with be discussed. After identifying the media and ribbon required to meet the labeling solution, Zebra printer specifications and capabilities will be compared and the applicable Zebra printer will be set up to produce the required labels. The printer set up will include the loading and unloading of supplies, operator preventive maintenance, overview of communication interfaces and protocols. The methods necessary to create the labeling solution will include an overview of the following label creation tools:

- ZPL® and ZPL II®
- Z-Tools Utility
- Zebra's driver for the Windows™ operating system

Labeling

The program begins with a brief review of basic ZPL and ZPL II. Since each of our printer maintenance and operations courses include an overview of ZPL and ZPL II, it is recommended that the student attend one of these courses prior to participating in this advanced program. After reviewing basics, the course looks at advanced ZPL techniques that provide increased throughput and enhanced graphics capabilities. Using Z-Tools, images and True Type Fonts® are applied to a label. With the assistance of Zebra's driver for the Windows™ operating system and Zebra's Bar-One®, Scan-One®, Wedge-One™, and Track-One® professional software, labels will be created, printed, and bar code data will be accumulated and tracked in the Track-One relational database.

To register for Zebra training, call our Technical Training staff at our International Headquarters in Vernon Hills, Illinois at (847) 634-6700 Ext. #2384.

To confirm your enrollment, a $100.00 USD deposit or purchase order must be received at least thirty (30) days prior to the scheduled course commencement. Deposits will be refunded if reservations are canceled in writing at least fifteen (15) days prior to the start of the course. Please note, when course enrollment is less than four attendees, we reserve the right to cancel the course.


Stryjo®

Appendix

Adjusting the Printhead

Only adjust the printhead position if you have done the following and are still experiencing unsatisfactory print quality (the procedures for these adjustments are located in Chapter 3.):

1. Check the initial print quality.
2. Adjust the print darkness.
3. Adjust the toggle pressure.

Printhead Position Adjustment Procedure	
Refer to Figure 36 throughout this procedure. You will need a #2 Phillips screwdriver, a 2.5 mm Hex (Allen Key) Driver, and a flathead screwdriver.	
1.	**To begin this procedure, printing on the test labels must initially be a light gray darkness.** First, press the MODE key (DARKEN light and PAUSE light turn ON) to permit darkness adjustment.
2.	Press the PAUSE key to begin printing test labels.
3.	While observing the print darkness, repeatedly press the DOWN (CANCEL) key to make the printing LIGHTER, until a light gray darkness is achieved. ***NOTE:*** *If the light gray print darkness is not achieved, it may be necessary to increase or decrease the Printhead Toggle Pressure.*
4.	Once proper print darkness is achieved, press the PAUSE key to stop printing.
5.	If the Cutter Module is used, remove it according to the instructions in this chapter. Remove the two Phillips head mounting screws that fasten the Tear-Off Plate, then remove the Tear-Off Plate by pressing it IN then UP to disengage the mounting bracket.
6.	Use a 2.5 mm Hex (Allen Key) Driver to remove the Printhead Support Bracket and the two mounting screws.
7.	Use a #2 Phillips screwdriver to loosen (do not remove) the two screws holding the Strip Plate in position.
8.	Also use the #2 Phillips screwdriver to loosen (do not remove) the two (2) Printhead Position Locking Screws two (2) full turns. Then re-tighten finger-tight to remove looseness.
9.	Use the Head Open Lever to push the Printhead and its Mounting Bracket all the way forward.
10.	Prepare to adjust the printhead position by placing a flathead screwdriver in one of the Printhead Adjustment Slots.
11.	Press the PAUSE key to start printing test labels.
12.	While applying forward pressure against the printhead with the Head Open Lever, adjust the Position Adjustment Slots, first one, then the other, until the darkest printing is observed on the test labels.
13.	Insure that the lines printed on the test labels are parallel to the top of the label by making minor adjustments to the left or right Slot/Screw.
14.	While still holding the Head Open Lever against the Printhead Bracket, tighten the two (2) Printhead Position Locking Screws.

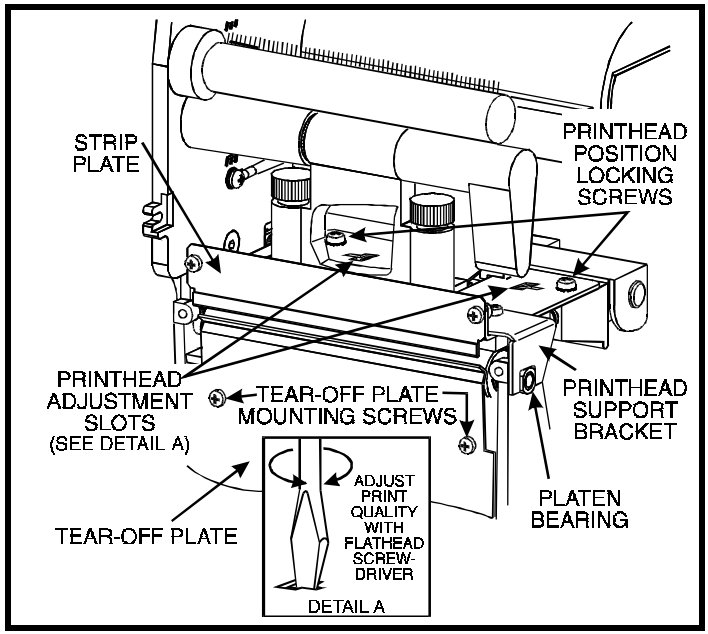

Figure 36 Print Quality Adjustment

15.	Re-install the Printhead Support Bracket using the two mounting screws.
16.	Press PAUSE and observe the test labels to insure consistent print quality and proper parallelism across the top of the labels. Repeat procedure if required.
17.	If, after adjusting printhead position, one side of the label is printing lighter than the other, refer to the Toggle Pressure Adjustment section (page 34) and slowly increase the Toggle Pressure on that side until the print darkness is balanced.
18.	Press the PAUSE key to stop printing. Reinstall the Tear-Off Plate and press the PAUSE key again to continue printing test labels.
19.	While observing the print darkness, repeatedly press the UP (FEED) key to make the printing DARKER until the optimum darkness is achieved. ***NOTE:*** *If the optimum print darkness cannot be achieved through the darkness adjustment, it may be necessary to increase the Printhead Toggle Pressure.* *To extend the life of your printhead, use the lowest Toggle Pressure that produces the desired print quality. Increasing Toggle Pressure to improve print quality is only recommended when the continued increase of print darkness does not provide satisfactory results.*
20.	While labels continue to print, position the Ribbon Strip Plate so the ribbon remains flat and smooth and tracks properly across the Ribbon Guide onto the Ribbon Takeup Spindle.
21.	Tighten the two Strip Plate mounting screws and print 40 to 50 labels to insure consistent print quality.
22.	If labels are printing properly, press the PAUSE key to stop printing.
23.	Press the MODE key three (3) times (all MODE lights flash and turn OFF) and the darkness setting will be saved in memory.
24.	Complete the process by turning the AC Power OFF.

Printer Interface Technical Information

RS-232 Interface

Signal Levels

For all RS-232 input and output signals, the Stripe printer follows both the Electronics Industries Association (EIA) RS-232 and the Consultative Committee for International Telegraph and Telephone (CCITT) V.24 standard signal level specifications.

RS-232 Connector Pinout

Pin No.	Description
1	Chassis Ground
2	TXD (Transmit Data) output from the printer
3	RXD (Receive Data) input to the printer
4	RTS (Request To Send) output from the printer
5	CTS (Clear To Send) input to the printer
6	DSR (Data Set Ready) input to the printer
7	Signal Ground
20	DTR (Data Terminal Ready) output from the printer

NOTE: *Pin #'s 8-19 and 21-25 are not used and are unterminated.*

Data signals are defined as either MARK or SPACE, while control signals are either ACTIVE or INACTIVE. The voltage levels which represent these conditions are:

Data Signal	RS-232 Voltage Level
MARK or INACTIVE =	-3 to -25 VDC
SPACE or ACTIVE =	+3 to +25 VDC

Hardware Control Signal Descriptions

Request To Send (RTS) is a control signal from the printer to the host computer. RTS is always in the ACTIVE condition (positive voltage) whenever the printer is powered ON.

Clear To Send (CTS) is a control signal from the host computer to the printer. When CTS is in the ACTIVE condition (positive voltage), the Stripe printer can transmit status to the host. When CTS is in the INACTIVE condition (negative voltage), the printer will not transmit any data.

When RTS/CTS handshaking is selected via DIP Switch # 7 at the rear of the printer, the Data Terminal Ready (DTR) Control Signal output from the printer controls when the host computer may send data. DTR ACTIVE (positive voltage), permits the host to send data. When the printer places DTR in the INACTIVE (negative voltage) state, the host must not send data.

NOTE: *When XON/XOFF handshaking is selected, data flow is controlled by the ASCII Control Codes DC1 (XON) and DC3 (XOFF). The DTR Control lead will have no effect.*

RS-232 Cabling Requirements

The required cable must have a 25-pin "D" Type (DB25P) connector on one end, which is plugged into the mating (DB25S) connector located inside the access opening on the left side of the printer. (Refer to Figure 11 on page 19 for the location of this cable.)

The other end of the Signal Interface Cable connects to an appropriate point at the host computer. This cable will be one of two types—standard or null modem—depending on the specific interface requirements.

Data cables must be fully shielded and fitted with metal or metallized connector shells. Shielded cables and connectors are required to prevent radiation and reception of electrical noise.

To minimize electrical noise pickup in the cable:

1. Keep data cables as short as possible.
2. Do not bundle the data cables tightly with power cords.
3. Do not tie the data cables to power wire conduits.

Interconnect To DTE Devices

The Stripe printer is configured as Data Terminal Equipment (DTE). To connect the printer to other DTE devices (such as the Serial Port of a personal computer), use an RS-232 NULL MODEM (crossover) cable. Figure 37 shows the required cable connections.

Interconnect To DCE Devices

When the Stripe printer is connected via its RS-232 interface to Data Communication Equipment (DCE) such as a modem, a STANDARD RS-232 (straight-through) interface cable must be used. Figure 38 shows the connections required for this cable.

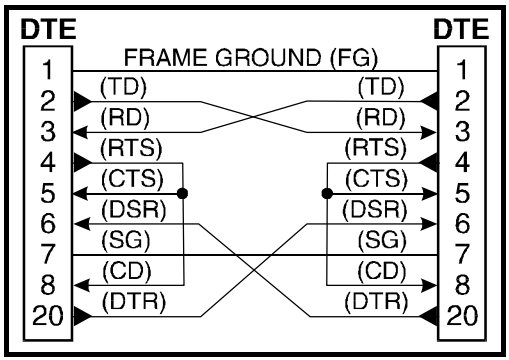

Figure 37 DTE to DTE Cable Connections

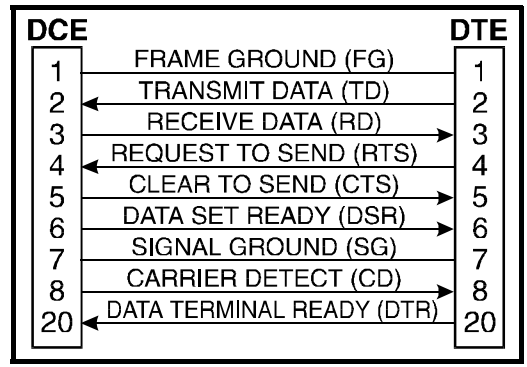

Figure 38 DCE to DTE Cable Connections

Parallel Interface

The parallel interface provides a means of communication which is typically faster than the previously mentioned serial interface method. In this method, the bits of data which make up a character are sent all at one time over several wires in the cable, one bit per wire.

Data signals are defined as either HIGH or LOW while control signals are either Active or Inactive. This distinction is due to the fact that some Control Signals are active HI while others are active LOW. The voltage levels which represent these conditions are:

Data Signal	Voltage Level
HIGH =	+5 VDC
LOW =	0 VDC

Parallel Cabling Requirements

The required cable must have a standard 36-pin parallel connector on one end, which is plugged into the mating connector located inside the access opening on the left side of the printer. Refer to Figure 1 on page 3. The parallel interface cable would be connected using bail clips, instead of screws, in a similar position as the serial data cable shown in the illustration.

The other end of the parallel interface cable connects to an appropriate point at the host computer.

Data cables must be fully shielded and fitted with metal or metallized connector shells. Shielded cables and connectors are required to prevent radiation and reception of electrical noise.

To minimize electrical noise pickup in the cable:

1. Keep data cables as short as possible.
2. Do not bundle the data cables tightly with power cords.
3. Do not tie the data cables to power wire conduits.

Signal Descriptions

The following chart provides a description of each of the pins in the parallel connector. A standard parallel data cable will provide the required interconnection between the computer and the Stripe printer.

Pin No.	Parallel Connector Pinout
1	The $\overline{\text{STROBE}}$ printer input has internal 3.3K pull-up resistors to 5V (I_{OL}= 1.5mA) and is designed to receive a signal driven open collector V_{OL} <= 0.8V. This pin is a signal from the host computer. Its LOW going edge will latch the data at the eight DATA inputs. Data is non-transparently latched so as to avoid hold time requirements on the DATA signals. The $\overline{\text{STROBE}}$ input is debounced to require an active width greater than 0.5 µS before data is latched.
2 - 9	DATA inputs have TTL input characteristics with internal 3.3K pullups and represent 1 TTL unit load or less. The DATA inputs are positive logic with a HIGH voltage level corresponding to a logic 1. Pin 2 through Pin 9 = D0 through D7 respectively.
10	The $\overline{\text{ACK}}$ output is a 12 microsecond active LOW pulse indicating that the printer is ready to accept data. The active LOW state precedes BUSY by 7 microseconds. $\overline{\text{ACK}}$ is driven open collector with a 3.3K ohm internal pull-up. The output sinks 7 mA to a V_{OL} <= 0.4V.
11	The BUSY output is active HIGH whenever the printer **cannot** accept data due to any normal or abnormal condition, including Buffer Overflow, Head Open, Over Temperature, and Media Error conditions. BUSY is driven open collector with a 3.3K ohm internal pull-up. The output sinks 7 mA to a V_{OL} <= 0.4V.
12	The PAPER OUT signal is active HIGH whenever the printer is out of media or ribbon.
13	The SELECT OUT signal function is determined by an additional configuration option which becomes active when the port is present. In the default condition, SELECT is active HIGH whenever the parallel port is powered up and the parallel port is enabled. In the non-default condition, SELECT will go active LOW whenever the printer is printing.
14	$\overline{\text{AUTOFEED}}$ is unterminated in the printer.
15	The $\overline{\text{ERROR}}$ output (Pin 15) is active LOW whenever any error condition is present. $\overline{\text{ERROR}}$ is driven open collector with a 3.3K ohm internal pull-up. The output sinks 7 mA to a V_{OL} <= 0.4V.
16	NOT USED - This lead should be left unconnected.
17	FRAME GROUND is unterminated in the printer.
18	UNDEFINED in this Parallel Interface. (*In other interfaces, pin 18 may supply 50 mA at +5V which is fuse protected.)*
19 - 30	SIGNAL GROUNDS are the Logic Grounds and Returns for all input and output signals.
31 - 36	NOT USED - These leads should be left unconnected.

Glossary

alphanumeric Indicating letters, numerals, and characters such as punctuation marks.

backfeed Backfeed is when the printer pulls the media and ribbon (if used) backward into the printer so that the beginning of the label to be printed is properly positioned behind the printhead. Backfeed occurs when you're operating the printer in tear-off, peel-off, or cutter mode.

bar code A code by which alphanumeric characters can be represented by a series of adjacent stripes of different widths. Many different code schemes exist, such as the universal product code (UPC) or Code 39.

calibration (of a printer) A process in which the printer determines some basic information needed to print accurately with a particular media/ribbon combination. To do this, the printer feeds some media and ribbon (if used) through the printer and senses whether to use the direct thermal or thermal transfer print method, whether continuous or non-continuous media will be used, and (if non-continuous media) the length of individual labels/tags.

character set The set of all letters, numerals, punctuation marks, and other characters that can be expressed by a particular barcode.

check digit A character added to a barcode symbol that indicates to the scanner that it has read the symbol correctly.

continuous media Label or tagstock that has no web (space between labels), notch, or gap to separate each label/tag, but rather the media is one long piece of material.

core diameter The inside diameter of the cardboard core at the center of a roll of media/ribbon.

cutter A device that can cut each label/tag immediately after it is printed.

diagnostics Information about what printer functions are not working. This information is used for troubleshooting problems.

direct thermal printing Printing in which direct thermal media is used. No ribbon is used. Instead, the media is coated with a substance which reacts to heat to produce an image.

fanfold media Media that comes folded in a rectangular stack, rather than on a roll.

font A complete set of alphanumeric characters in one style of type. Ex: Times, Helvetica.

ips "inches-per-second" The speed at which the label or tag is printed. Zebra offers printers that can print from 2 ips to 12 ips.

label An adhesive-backed piece of paper, plastic, or other material on which information is printed.

label available sensor For printers equipped with the Peel-Off Option, this sensor detects a printed label waiting to be taken or "picked" by the operator. While it detects this label, the printer will not print additional labels. Once the label has been taken, printing resumes. Also called "take-label sensor".

label backing (label liner) The material on which labels are affixed during manufacture and which is discarded or

recycled by the end-users. Label backing (or liner) has a non-stick surface which allows the label to be easily removed by the end-user and placed in the desired location.

media Material onto which data is printed by the printer. Types of media include: tagstock, continuous, fanfold, roll, etc.

media sensor This sensor is located behind the printhead to detect the presence of media and, for non-continuous media, the position of the web, hole, or notch that separates each label.

media supply spindle The rotating arm that supports media rolls and provides consistent media feed to the printhead.

non-volatile memory Electronic memory that retains data even when power is removed.

print speed The speed at which printing occurs. For thermal transfer printers, this speed is expressed in terms of ips (inches per second). Zebra offers printers that can print from 2 ips to 12 ips.

printhead wear The degradation of the surface of the printhead and/or the print elements over time. Heat and abrasion can cause printhead wear. Therefore, to maximize the life of your printhead use the lowest print darkness setting (sometimes called burn temperature or head temperature) and the lowest printhead/toggle pressure necessary. Also, use ribbon that is as wide or wider than the media, to protect the printhead from the rougher media.

registration Alignment of printing with respect to the top of a label/tag.

ribbon A band of inked material that is pressed by the printhead against the media to transfer an image onto the media, which in turn is pressed against the platen. A ribbon consists of a base film coated with wax or resin "ink". Zebra ribbons also have a back coating that protects the printhead from damage. The ribbon transfers ink onto the media when heated by the printhead.

ribbon wrinkle A wrinkling of the ribbon caused by improper alignment of the strip plate and/or printhead pressure. This wrinkle can be seen just above the strip plate. Ribbon wrinkle can cause voids in the print and/or the spent ribbon to rewind unevenly. This is a condition that should be corrected by performing adjustment procedures.

roll media Media that comes supplied rolled up on a core (usually cardboard). Contrast this with fanfold media, which comes folded in a rectangular stack.

supplies Supplies is a general term for ribbon and media.

tag A type of media having no adhesive backing but featuring a hole or notch by which the tag can be hung on something. Usually tags are made of cardboard or other durable material.

take label sensor See “label available sensor”.

thermal direct printing See "direct thermal printing".

thermal transfer printing A printing method in which the printhead heats an ink- or resin-coated ribbon against the media, causing the ink/resin to transfer onto the media. By selectively heating the ribbon, you can form an image on the media. See also "ribbon".

void A space where printing should have occurred but, due to some error condition, it did not occur. A void can cause a bar code symbol to be read incorrectly or to not be read at all.

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